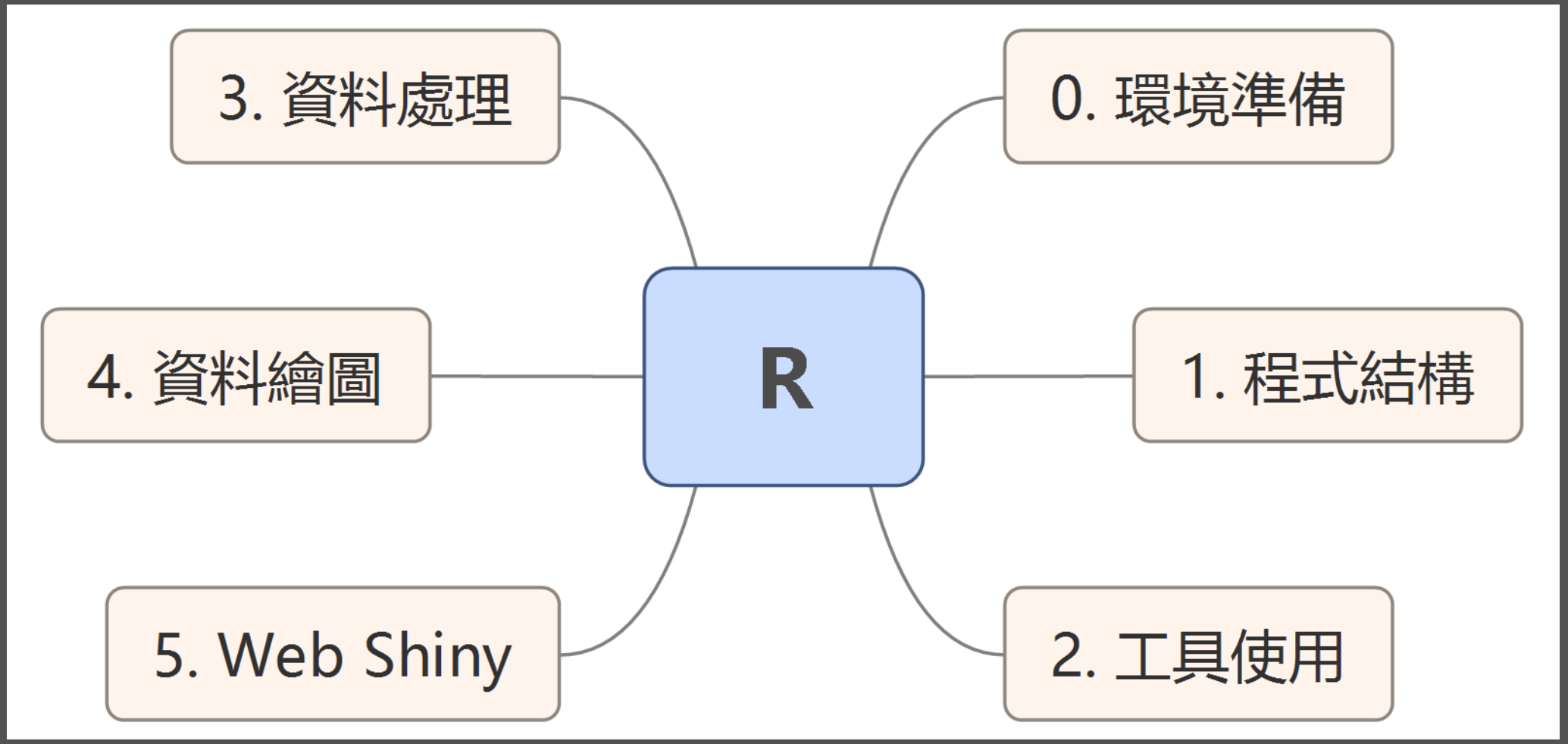
R 工具使用

目的

在此說明 R 基本的匯入匯出方案。



R 讀取與載入資料

1. CSV
2. EXCEL
3. 資料庫讀取
4. 統計軟體資料
5. R 二進位檔
6. R 內建資料集
7. 網路爬資料

R 讀取與載入資料

1. CSV
    (1) read.table
    (2) read.csv

```
theUrl = "https://raw.githubusercontent.com/kancheng/easyR/master/C02/im_2010.csv"
udf = read.table (file = theUrl, header = TRUE, sep = ",")
head(udf)
dim(udf)
```

```
> theUrl = "https://raw.githubusercontent.com/kancheng/easyR/master/C02/im_2010.csv"
> udf = read.table (file = theUrl, header = TRUE, sep = ",")
> head(udf)
       sid loan pjm ines cala calb sta ec ac mana sadm mis pom itdc cppg
1 SD990595    0  94   91   60   68  71 73 62   89   87  77  73   73   30
2 SD990596    0  89   74   60    0  60 60 73   84   89  74  67   77   81
3 SD990597    0  85   87   61   60  70 42 65   85   88  85  76   64   36
4 SD990598    0  90   89   25   30  74 46 75   86   90  80  82   81   61
5 SD990599    0  79   79   69   60  65 78 61   84   90  71  74   61   35
6 SD990600    1  66   69   50   65  60 56 64   86   90  69  72   81   78
  dtst oopg pcpg adcpg nwkpm itdcn inkpg xmwd idbs dbms
1   30   60   60    35    79    67    71   70   60   76
2   23   17   60    44    63    69    71   60   48   64
3   27   60   60    40    78    72    75   71   60   92
4   60   64   60    60    81    79    92   83   66   97
5   36   39   60    31    66    67    80   69   60   76
6   37   60   60    60    77    69    85   71   64   62
> dim(udf)
[1] 143  25
>
```

R 讀取與載入資料

udf2 = read.table (file = theUrl, sep = ",")
head(udf2)

```
> udf2 = read.table (file = theUrl, sep = ",")
> head(udf2)
         V1   V2  V3   V4   V5   V6  V7 V8 V9  V10  V11 V12 V13  V14  V15  V16  V17
1       sid loan pjm ines cala calb sta ec ac mana sadm mis pom itdc cppg dtst oopg
2 SD990595    0  94   91   60   68  71 73 62   89   87  77  73   73   30   30   60
3 SD990596    0  89   74   60    0  60 60 73   84   89  74  67   77   81   23   17
4 SD990597    0  85   87   61   60  70 42 65   85   88  85  76   64   36   27   60
5 SD990598    0  90   89   25   30  74 46 75   86   90  80  82   81   61   60   64
6 SD990599    0  79   79   69   60  65 78 61   84   90  71  74   61   35   36   39
   V18   V19   V20   V21   V22  V23  V24  V25
1 pcpg adcpg nwkpm itdcn inkpg xmwd idbs dbms
2   60    35    79    67    71   70   60   76
3   60    44    63    69    71   60   48   64
4   60    40    78    72    75   71   60   92
5   60    60    81    79    92   83   66   97
6   60    31    66    67    80   69   60   76
>
```

R 讀取與載入資料

當中的 file、header、sep 為 read.table 函數中的引數

file ->為匯進來的名稱
header -> 是否將資料的第一橫列設為直行
sep -> 資料的分隔符號

sep 通常用的分隔
\t -> tab 鍵
; -> 分號

當中有個引數 stringsAsFactors (預設為 TRUE)，以防 character 直行轉為 factor，尤其在面對很多重複的字元(character)時可以利用，同樣的這個引數在 data.frame 也能用到。

Description

Reads a file in table format and creates a data frame from it, with cases corresponding to lines and variables to fields in the file.

Usage

```
read.table(file, header = FALSE, sep = "", quote = "\"'",
           dec = ".", numerals = c("allow.loss", "warn.loss", "no.loss"),
           row.names, col.names, as.is = !stringsAsFactors,
           na.strings = "NA", colClasses = NA, nrows = -1,
           skip = 0, check.names = TRUE, fill = !blank.lines.skip,
           strip.white = FALSE, blank.lines.skip = TRUE,
           comment.char = "#",
           allowEscapes = FALSE, flush = FALSE,
           stringsAsFactors = default.stringsAsFactors(),
           fileEncoding = "", encoding = "unknown", text, skipNul = FALSE)

read.csv(file, header = TRUE, sep = ",", quote = "\"",
         dec = ".", fill = TRUE, comment.char = "", ...)

read.csv2(file, header = TRUE, sep = ";", quote = "\"",
          dec = ",", fill = TRUE, comment.char = "", ...)

read.delim(file, header = TRUE, sep = "\t", quote = "\"",
           dec = ".", fill = TRUE, comment.char = "", ...)

read.delim2(file, header = TRUE, sep = "\t", quote = "\"",
            dec = ",", fill = TRUE, comment.char = "", ...)
```

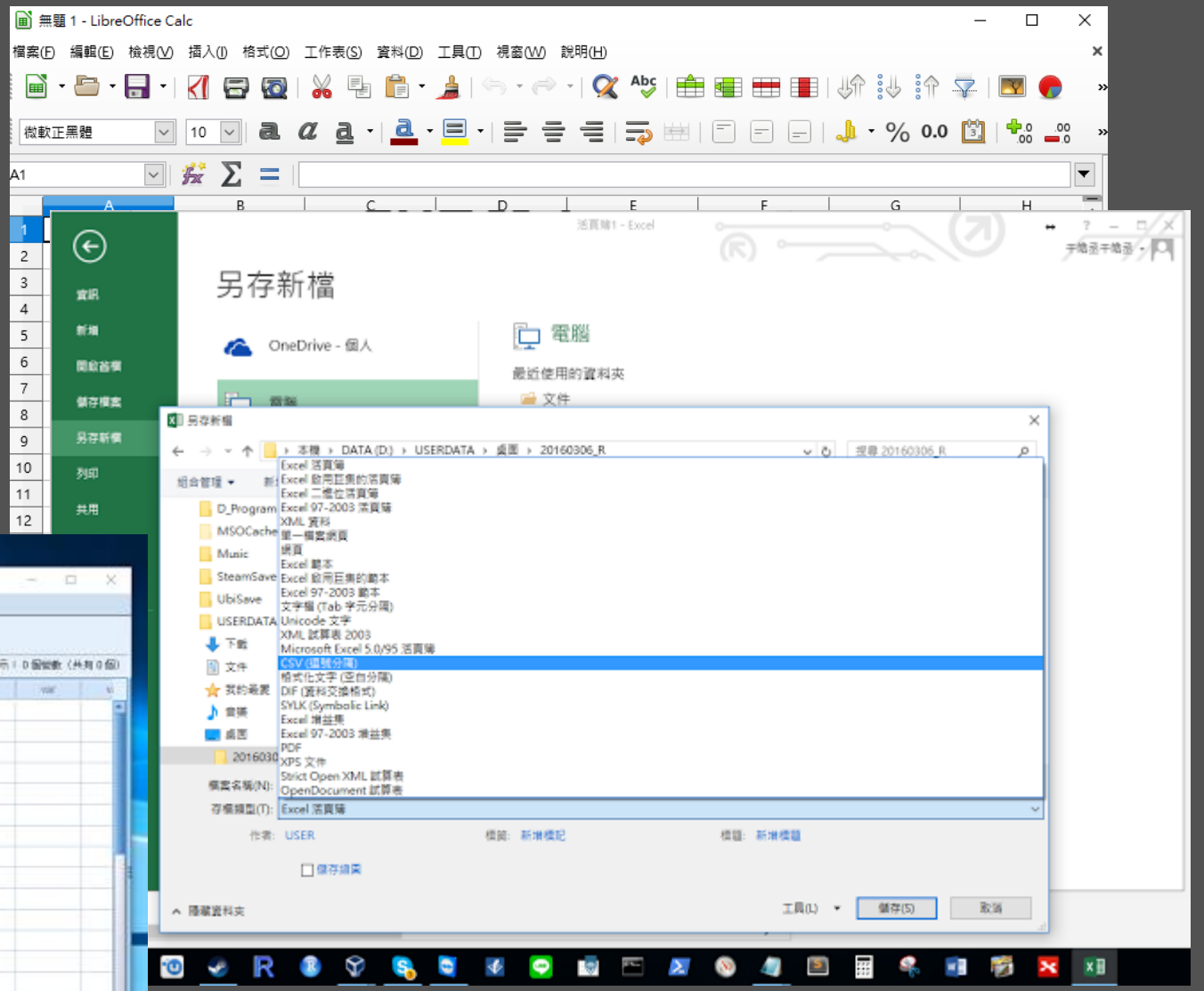
R 讀取與載入資料

```
x = 10:1
y = -4:5
q = c("Hockey", "Football", "Baseball",
            "Curling", "Rugby", "Lacrosse",
            "Basketball", "Tennis", "Cricket",
            "Soccer")
theDF = data.frame( First = x,
            Second = y, Sport = q,
            stringsAsFactors = FALSE)
theDF
theDF$Sport
```

```
> x = 10:1
> y = -4:5
> q = c("Hockey", "Football", "Baseball",
+ "Curling", "Rugby", "Lacrosse",
+ "Basketball", "Tennis", "Cricket",
+ "Soccer")
> theDF = data.frame( First = x,
+ Second = y, Sport = q,
+ stringsAsFactors = FALSE)
> theDF
   First Second      Sport
1     10     -4     Hockey
2      9     -3   Football
3      8     -2   Baseball
4      7     -1    Curling
5      6      0      Rugby
6      5      1   Lacrosse
7      4      2 Basketball
8      3      3     Tennis
9      2      4    Cricket
10     1      5     Soccer
> theDF$Sport
 [1] "Hockey"     "Football"   "Baseball"   "Curling"    "Rugby"
 [6] "Lacrosse"   "Basketball" "Tennis"     "Cricket"    "Soccer"
>
```

R 讀取與載入資料

其實 Excel 等試算表軟體或者統計軟體直接轉存成 CSV 即可，當然過程要注意該作業系統編碼的問題。



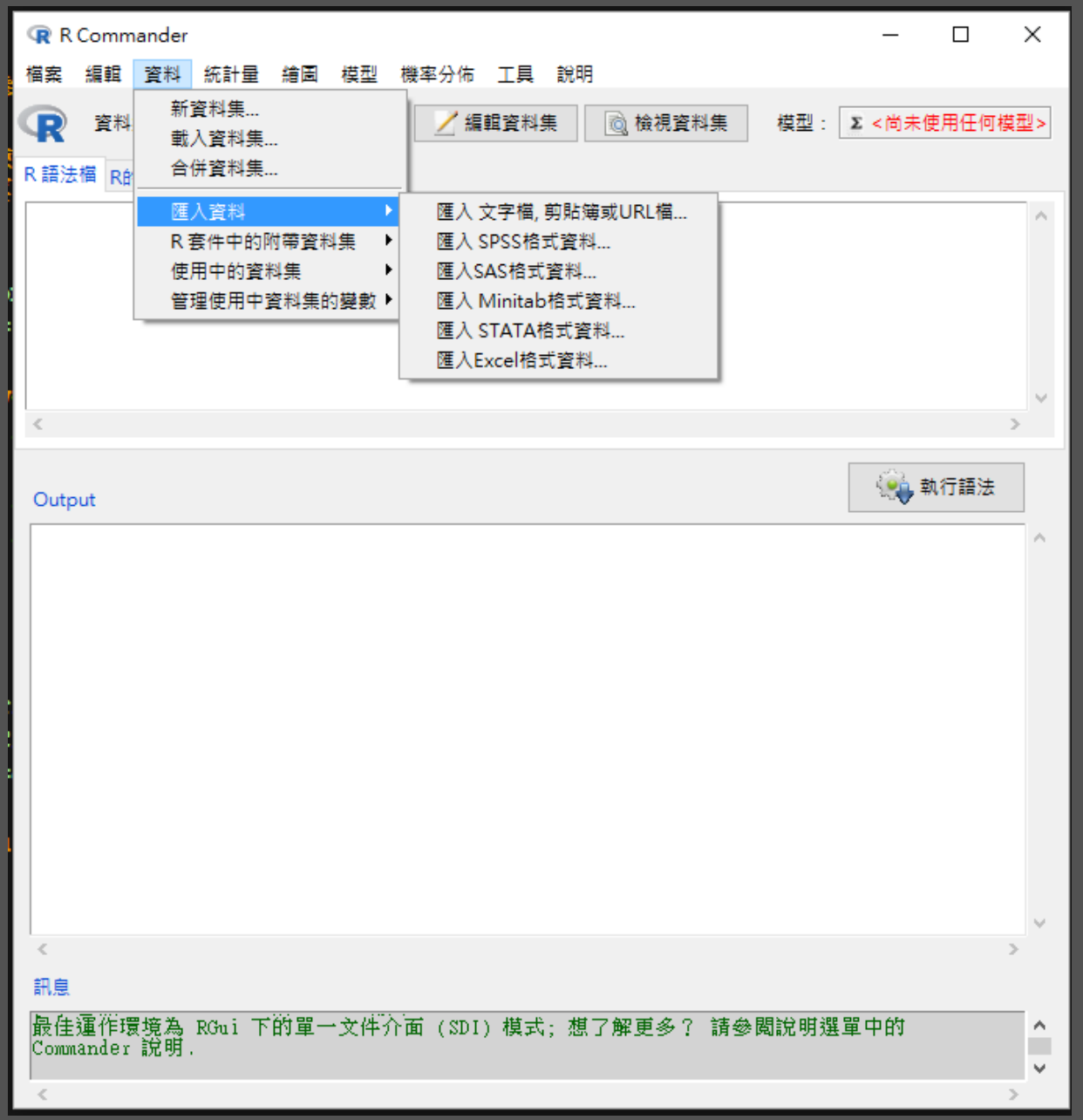
R Commander

這邊就不解釋了，除了轉存CSV，你可以直接用套件進行動作。

Packages 推薦 -> gdata、XLConnect、xlsReadWrite

RODBC Packages 函數 -> odbcConnectExcel2007

```
# install.packages("Rcmdr")
library("Rcmdr")
```



R Excel

若無安裝好 JAVA，xlsx 這個套件會無法使用。

```
> require("xlsx")
Loading required package: xlsx
Loading required package: rJava
Error : .onLoad failed in loadNamespace() for 'rJava', details:
  call: fun(libname, pkgname)
  error: JAVA_HOME cannot be determined from the Registry
Failed with error:  'package 'rJava' could not be loaded'
>
```

1. xls

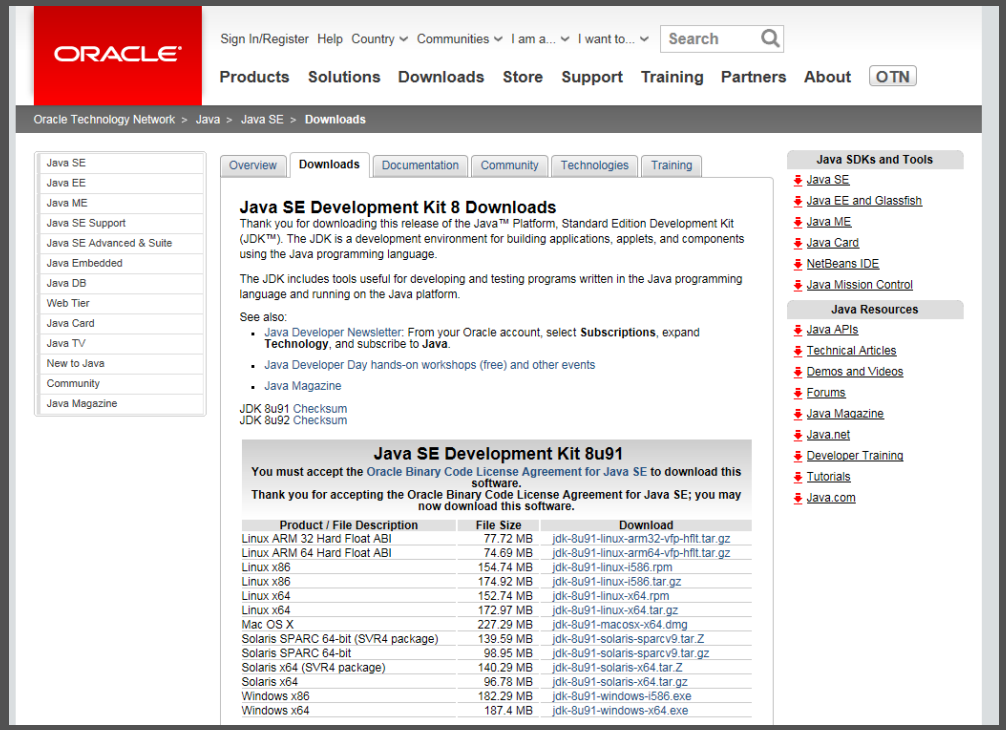
使用 R Commander

2. xlsx

使用 xlsx 套件

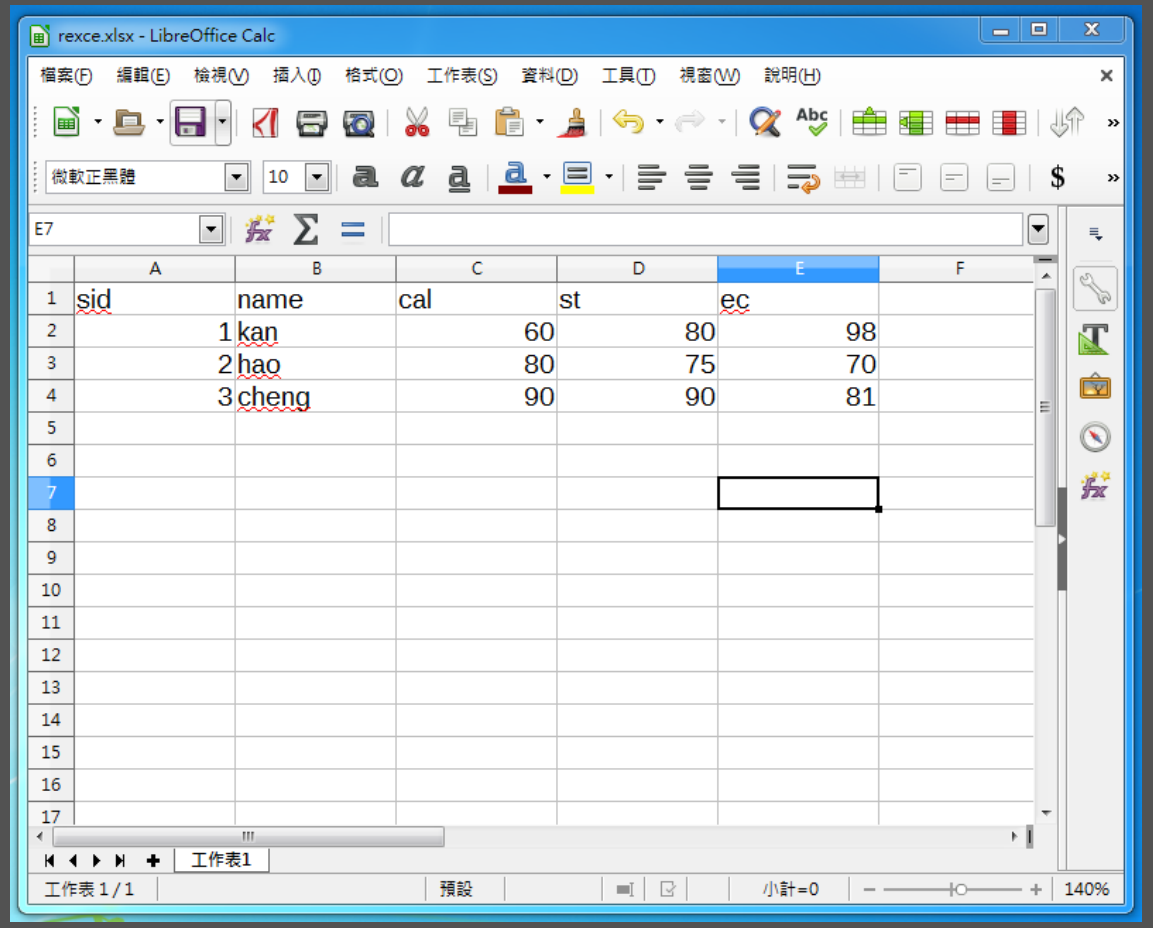
```
> install.packages("xlsx")
--- Please select a CRAN mirror for use in this session ---
also installing the dependencies 'rJava', 'xlsxjars'

嘗試 URL 'https://cran.ism.ac.jp/bin/windows/contrib/3.3/rJava_0.9-8.zip'
Content type 'application/zip' length 713501 bytes (696 KB)
downloaded 696 KB

嘗試 URL 'https://cran.ism.ac.jp/bin/windows/contrib/3.3/xlsxjars_0.6.1.zip'
Content type 'application/zip' length 9485180 bytes (9.0 MB)
downloaded 9.0 MB

嘗試 URL 'https://cran.ism.ac.jp/bin/windows/contrib/3.3/xlsx_0.5.7.zip'
Content type 'application/zip' length 400993 bytes (391 KB)
downloaded 391 KB

package 'rJava' successfully unpacked and MD5 sums checked
package 'xlsxjars' successfully unpacked and MD5 sums checked
package 'xlsx' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\F502\AppData\Local\Temp\Rtmp6x5yl8\downloaded_packages
>
```

直接 google 搜尋 jdk，找到 Oracle 在其下載頁面中，選擇我同意並挑選相應的版本安裝即可。

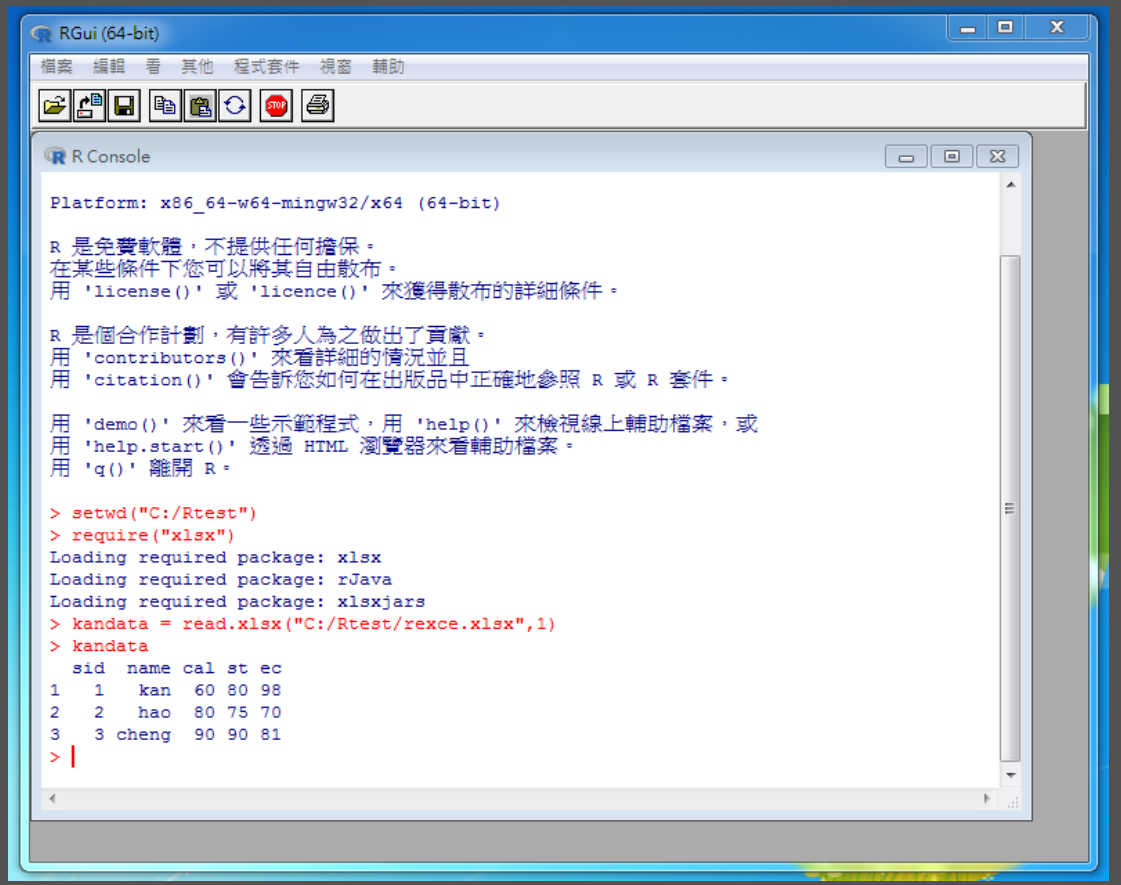


R Excel

用 Libre Office 自行建立的 Excel (.xlsx) 格式的資料



	A	B	C	D	E	F
1	sid	name	cal	st	ec	
2	1	kan	60	80	98	
3	2	hao	80	75	70	
4	3	cheng	90	90	81	
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						

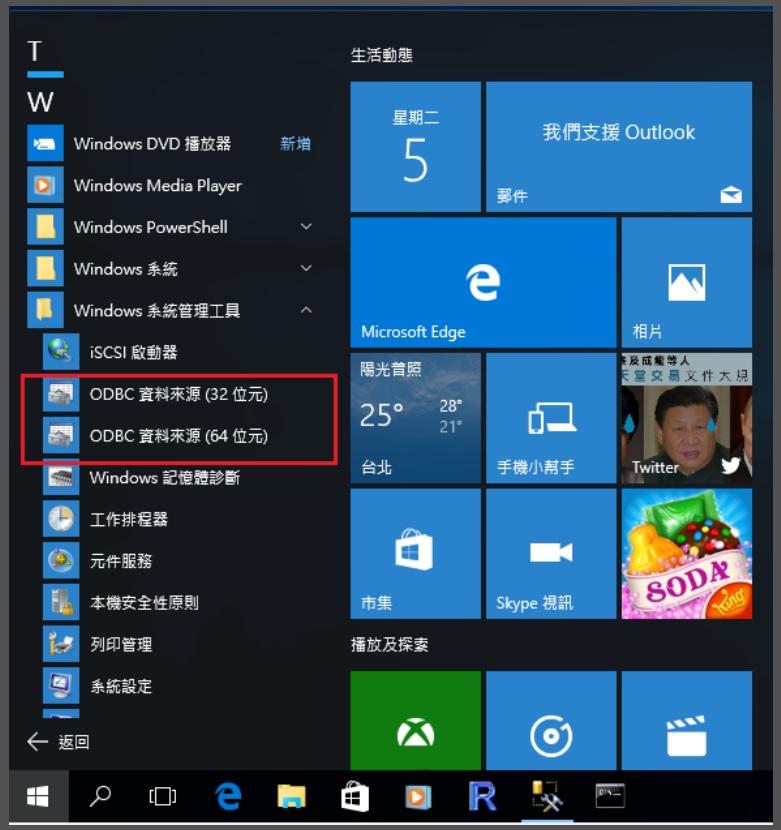



```
install.packages("xlsx")
require("xlsx")
data = read.xlsx("C:/Path/EFile.xlsx", 1)
data
```

R ODBC MS SQL Server

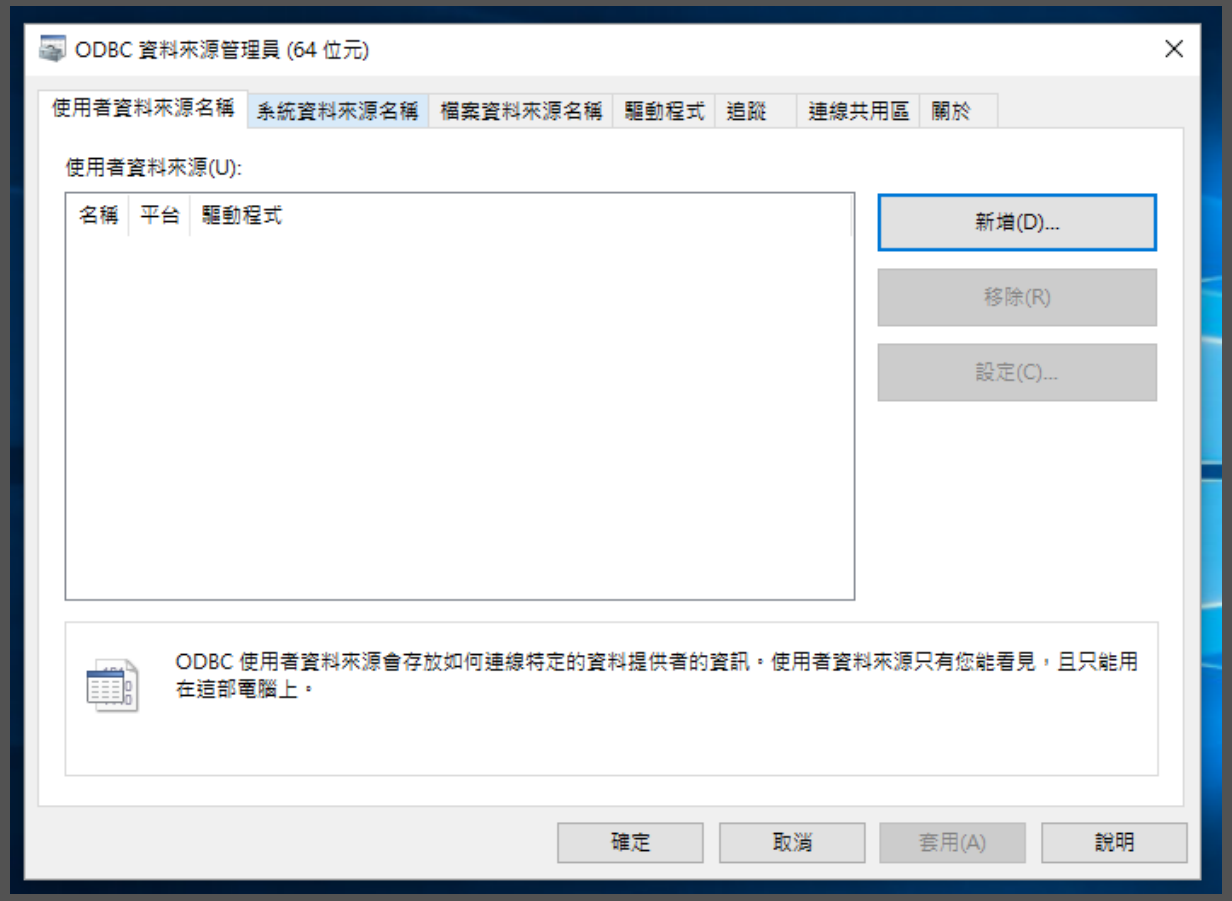
MS SQL Server 必須安裝好，然後 Windows 版本中要有 ODBC。

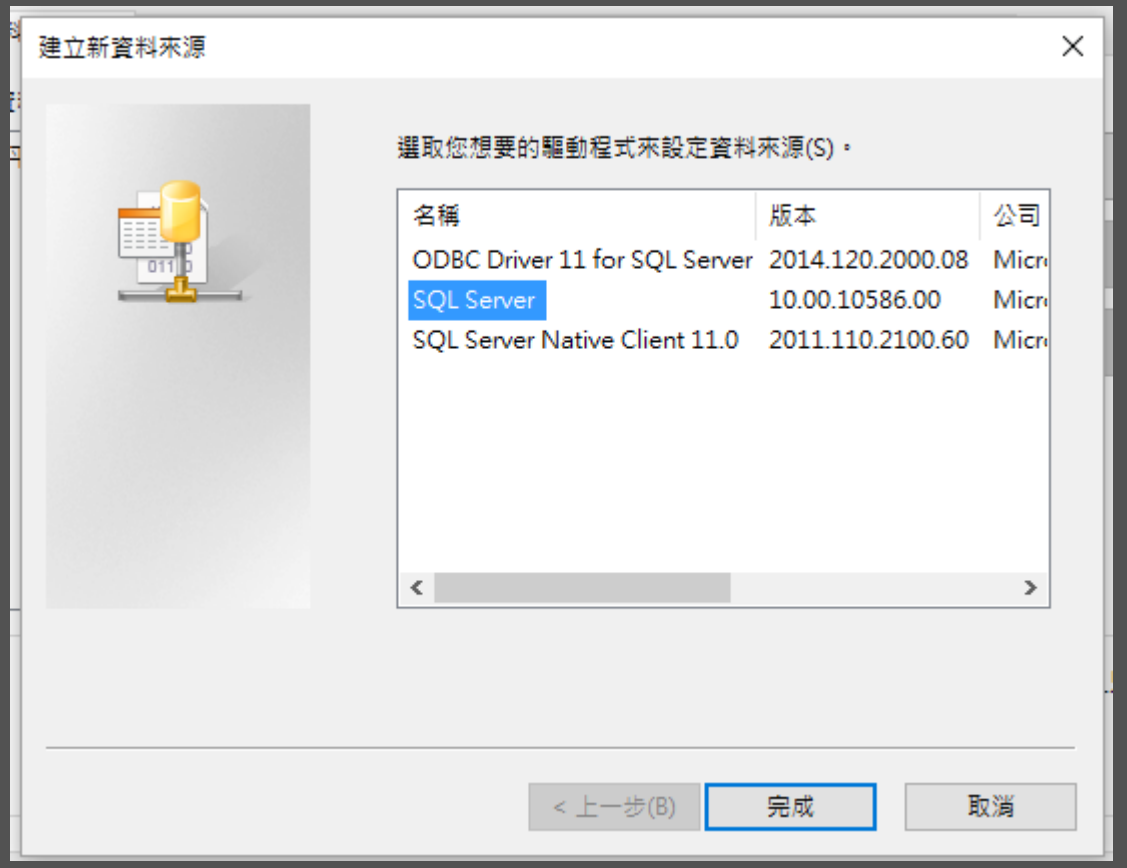
install.packages("RODBC")



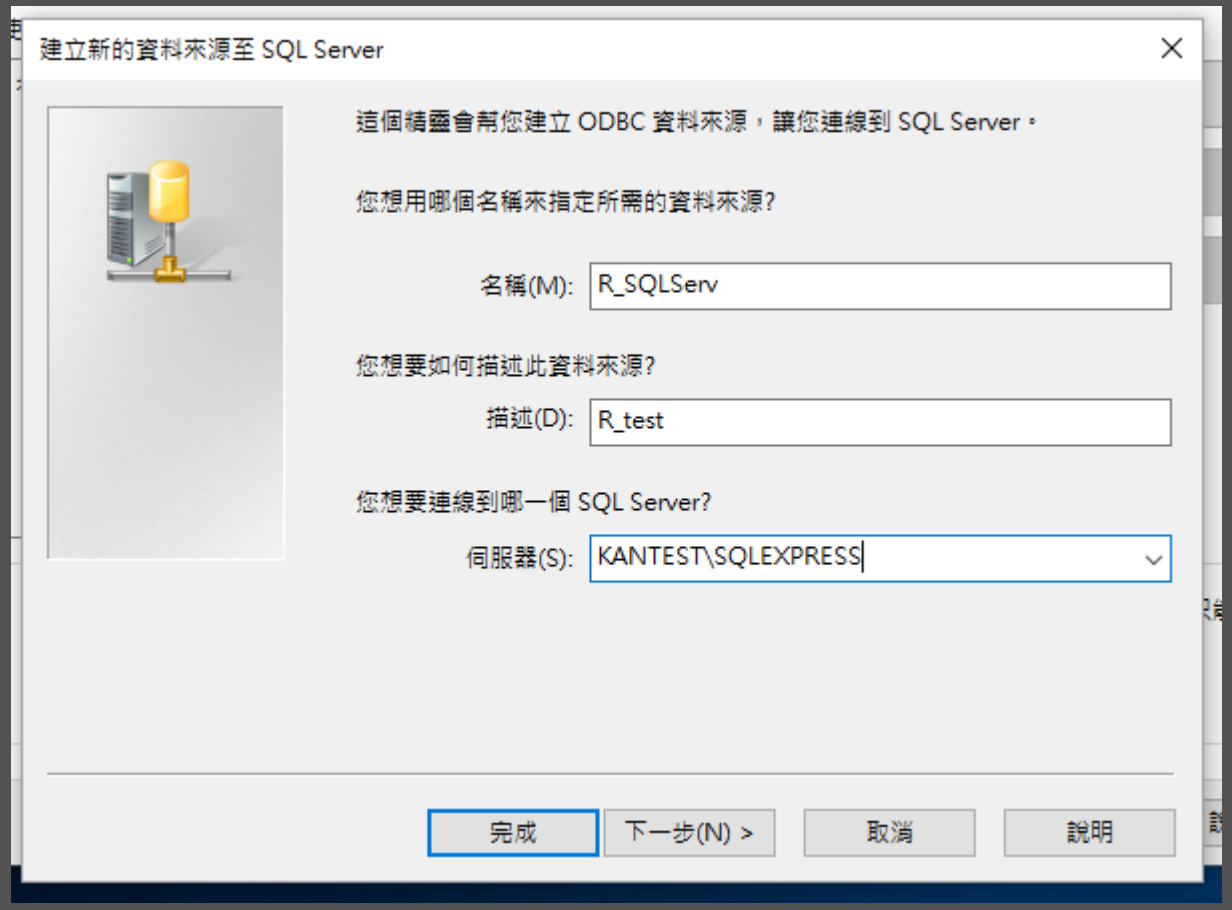

```
> install.packages("RODBC")
Warning in install.packages("RODBC") :
  'lib = "C:/Program Files/R/R-3.2.4revised/library"' is not writable
--- Please select a CRAN mirror for use in this session ---
嘗試 URL 'https://cloud.r-project.org/bin/windows/contrib/3.2/RODBC_1.3-12.z$
Content type 'application/zip' length 829435 bytes (809 KB)
downloaded 809 KB

package 'RODBC' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\root\AppData\Local\Temp\RtmpEXZYdb\downloaded_packages
>
```

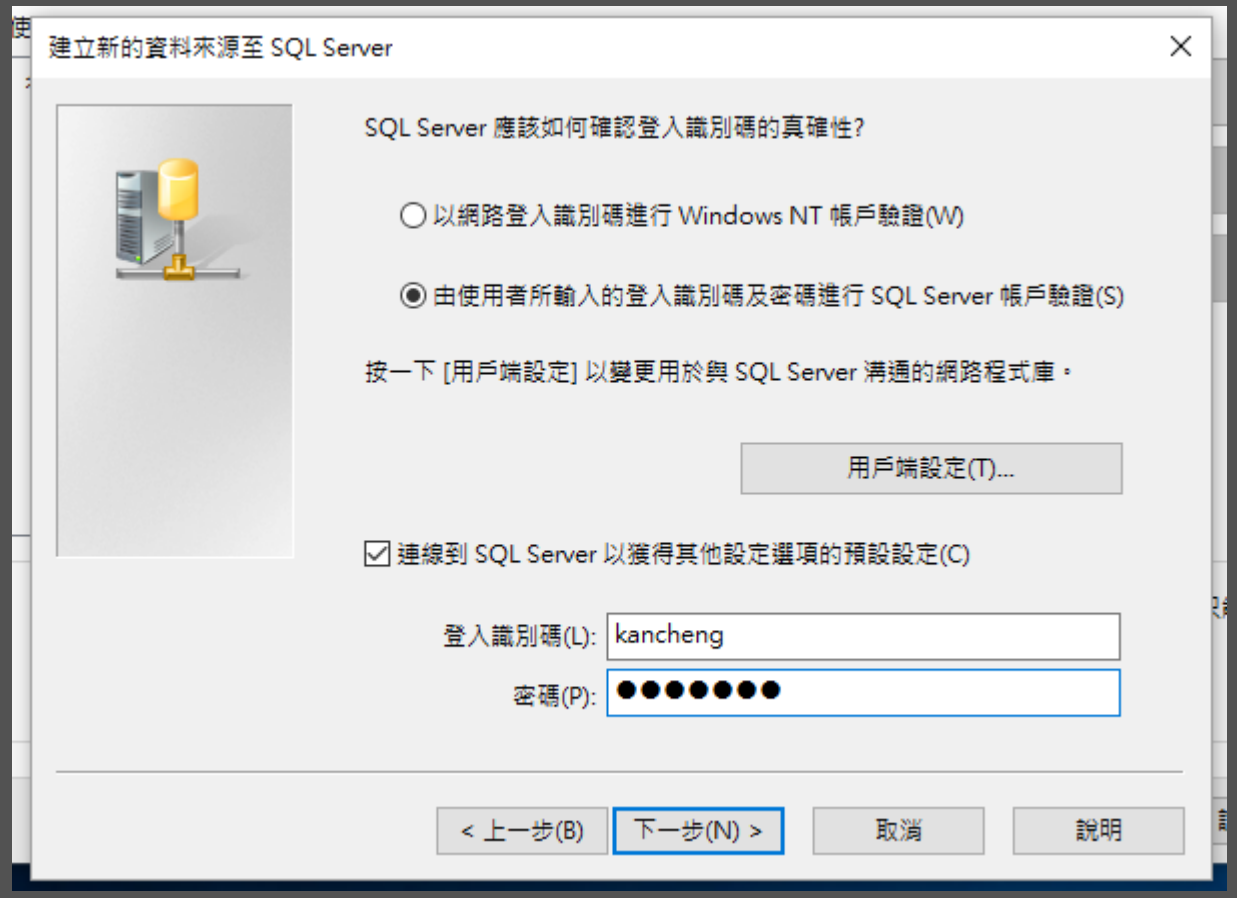
R ODBC MS SQL Server





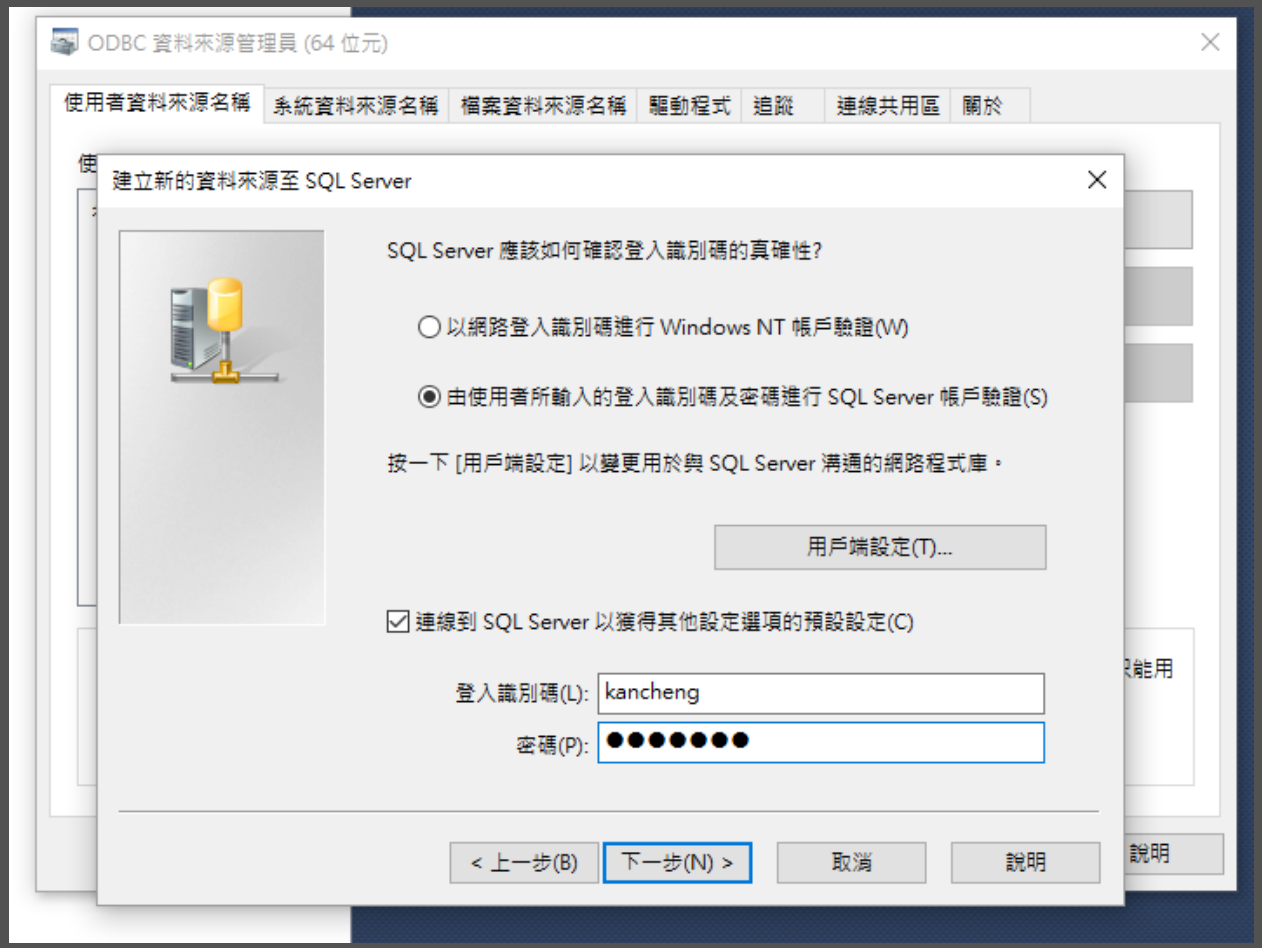
R ODBC MS SQL Server

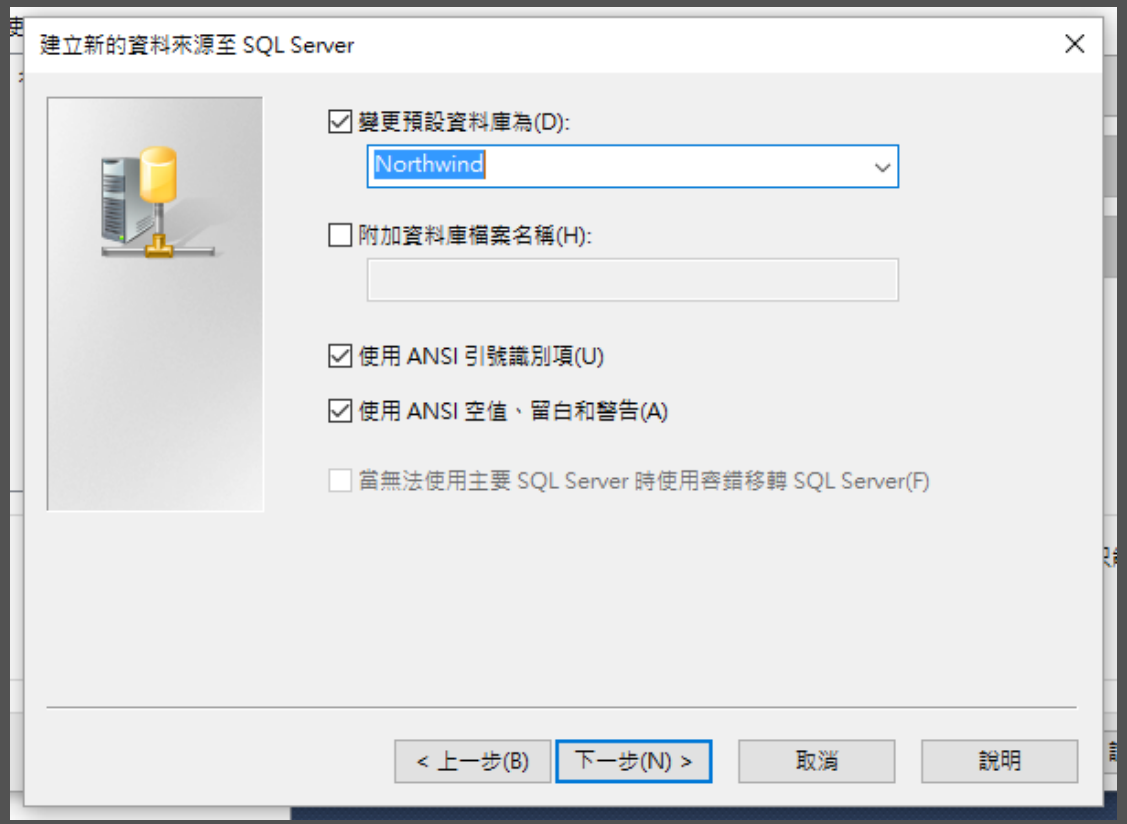




R ODBC MS SQL Server

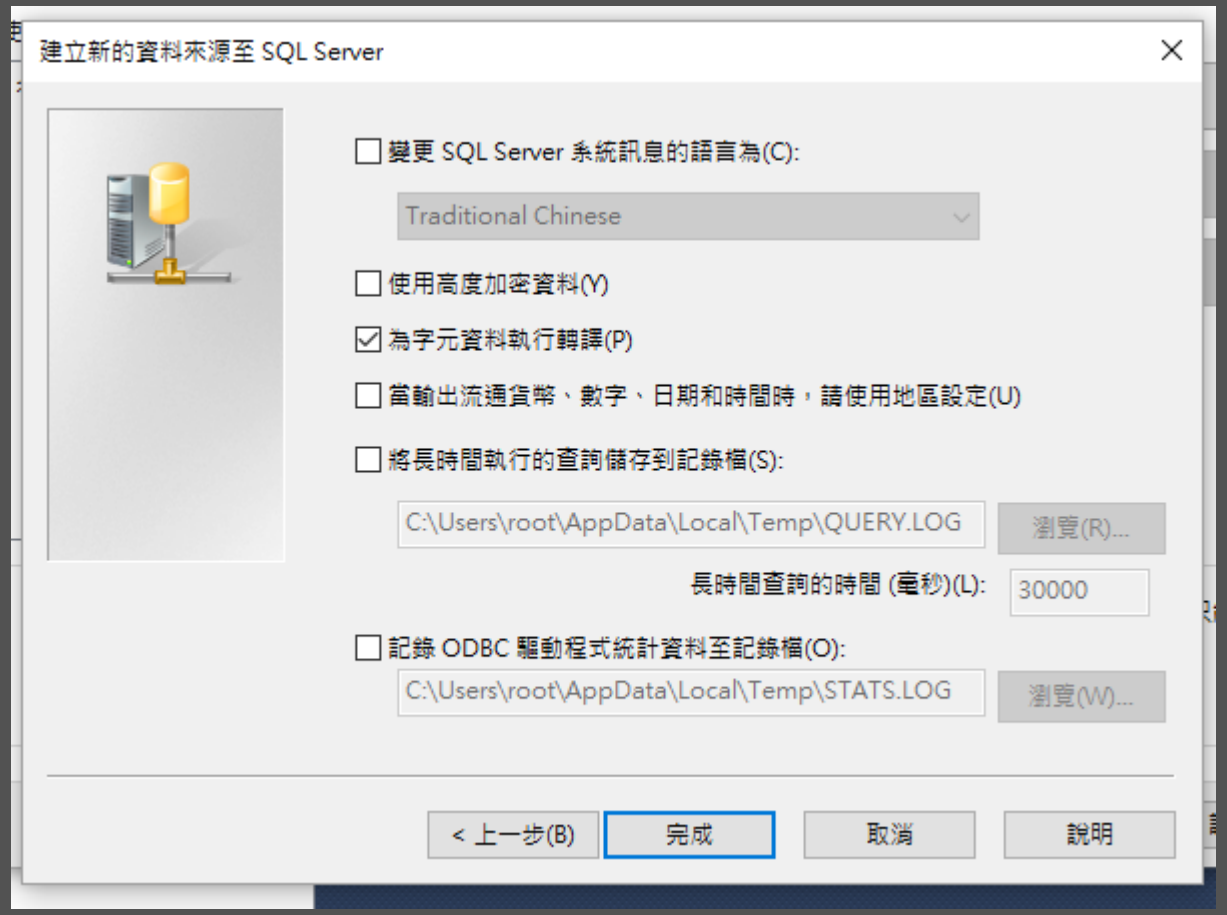
檢查 MSSQL、MSSQL內的DB與帳號、TCP/IP 這些設定有沒有問題!!!
設定自己之前在 MS 下載的 範例資料庫 Northwind

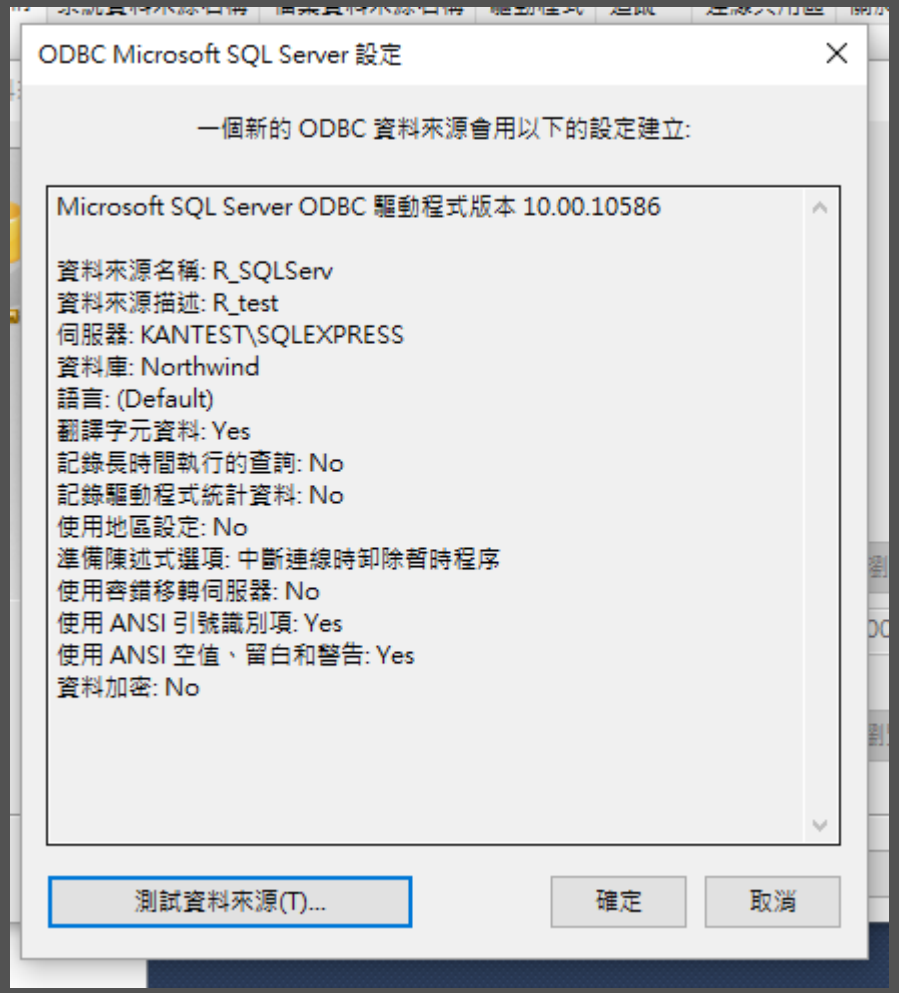




R ODBC MS SQL Server

完成 !!!



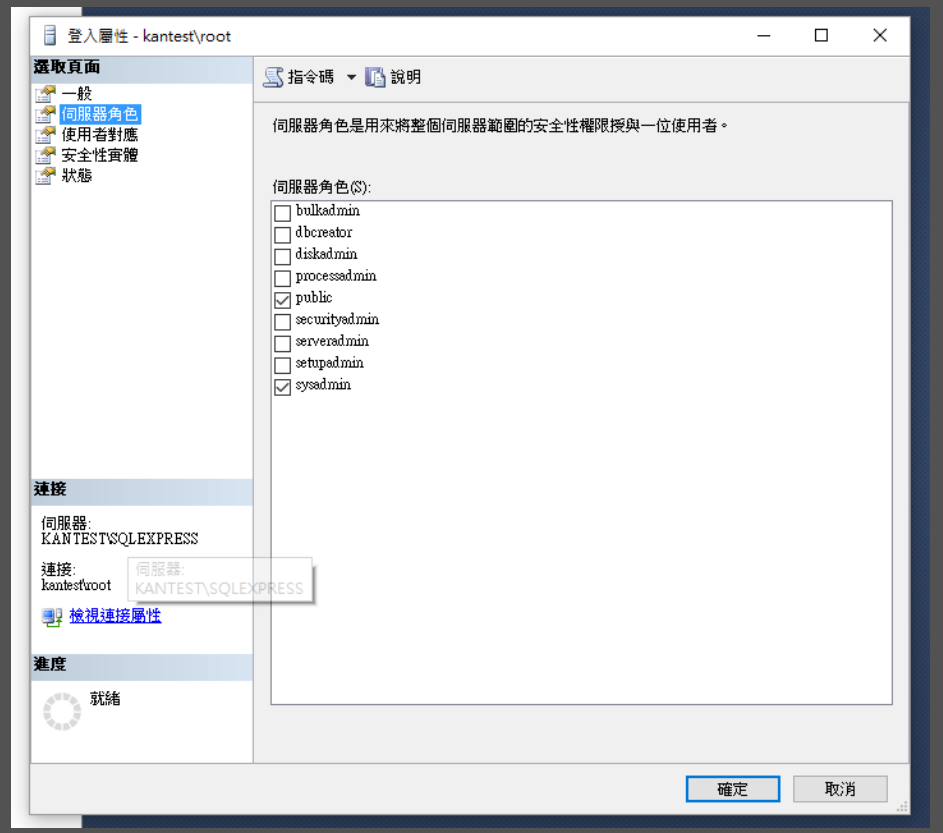


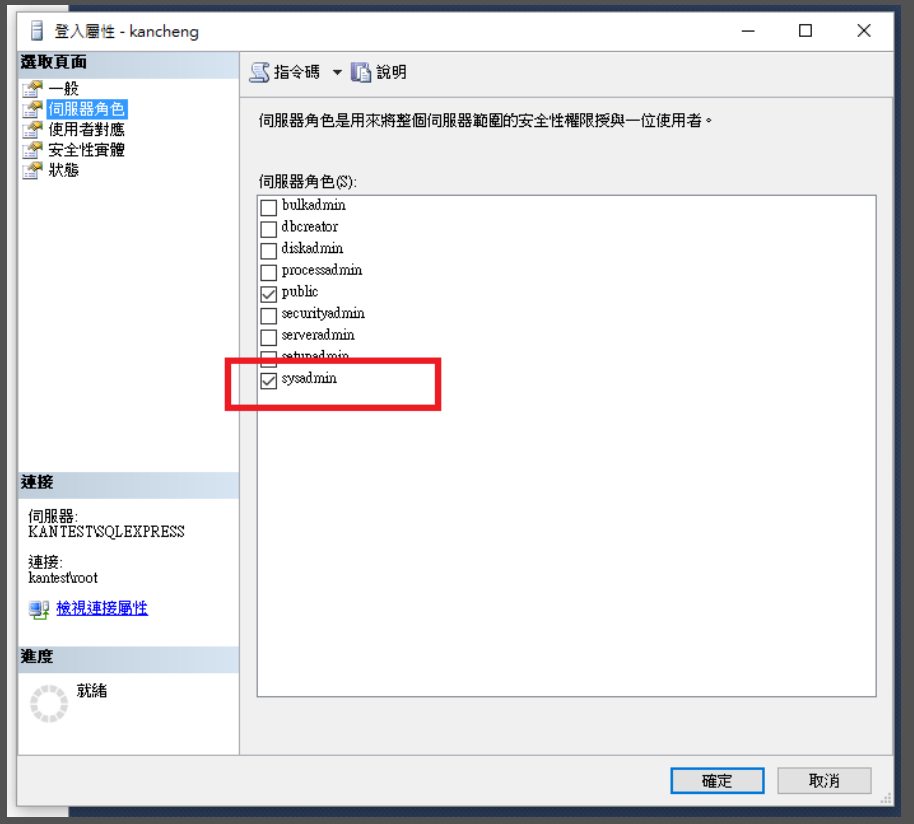
R ODBC MS SQL Server

MS SQL 帳號會因為權限不足的問題，我將權限設定用成跟MSSQL 主機模式下的 Windows系統帳號權限一樣 (也就是 sysadmin)

主機帳號權限

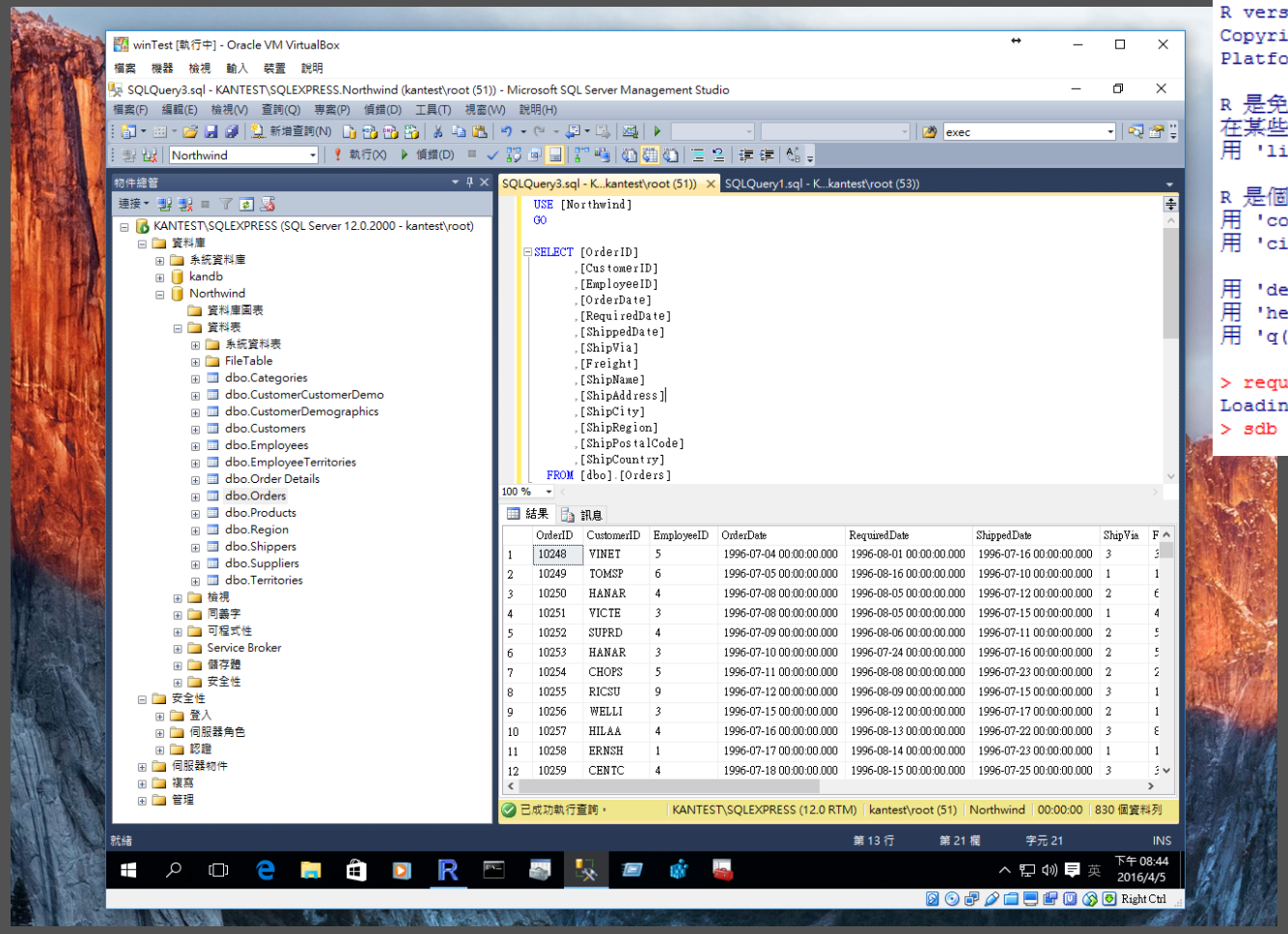
kantest -> 主機名稱
root -> 主機系統權限帳號名稱
觀察 sysadmin 權限!!!

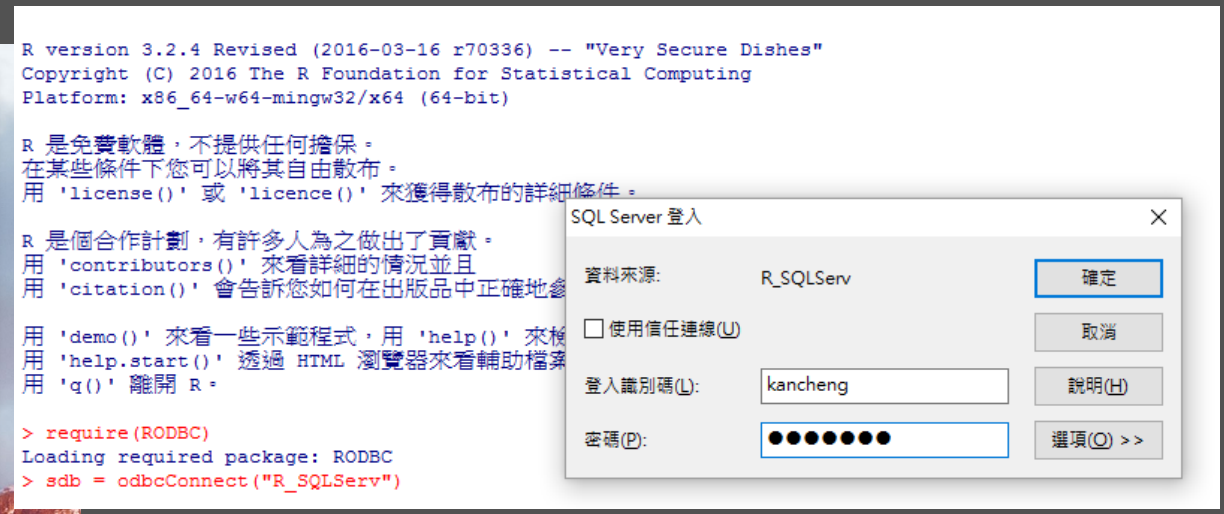




R ODBC MS SQL Server

使用 R 利用 RODBC 對 MS SQL 的 Northwind 資料庫進行查詢
這是這回所要利用的表 -> dbo.Orders





R ODBC MS SQL Server

require(RODBC)
sdb = odbcConnect("R_SQLServ")

```
> require(RODBC)
Loading required package: RODBC
> sdb = odbcConnect("R_SQLServ")
> ordtable = sqlQuery(sdb, "SELECT * FROM  dbo.Orders", stringsAsFactors = FALSE)
> class(ordtable)
[1] "data.frame"
> names(ordtable)
 [1] "OrderID"        "CustomerID"     "EmployeeID"     "OrderDate"      "RequiredDate"   "ShippedDate"    "ShipVia"        "Freight"
 [9] "ShipName"       "ShipAddress"    "ShipCity"       "ShipRegion"     "ShipPostalCode" "ShipCountry"
> head(ordtable,n=3)
  OrderID CustomerID EmployeeID  OrderDate RequiredDate ShippedDate ShipVia Freight                  ShipName        ShipAddress
1   10248      VINET          5 1996-07-04   1996-08-01  1996-07-16       3   32.38 Vins et alcools Chevalier 59 rue de l'Abbaye
2   10249      TOMSP          6 1996-07-05   1996-08-16  1996-07-10       1   11.61        Toms Spezialitaten      Luisenstr. 48
3   10250      HANAR          4 1996-07-08   1996-08-05  1996-07-12       2   65.83             Hanari Carnes    Rua do Paco, 67
        ShipCity ShipRegion ShipPostalCode ShipCountry
1          Reims       <NA>          51100      France
2        Munster       <NA>          44087     Germany
3 Rio de Janeiro         RJ      05454-876      Brazil
>
```

R ODBC MS SQL Server

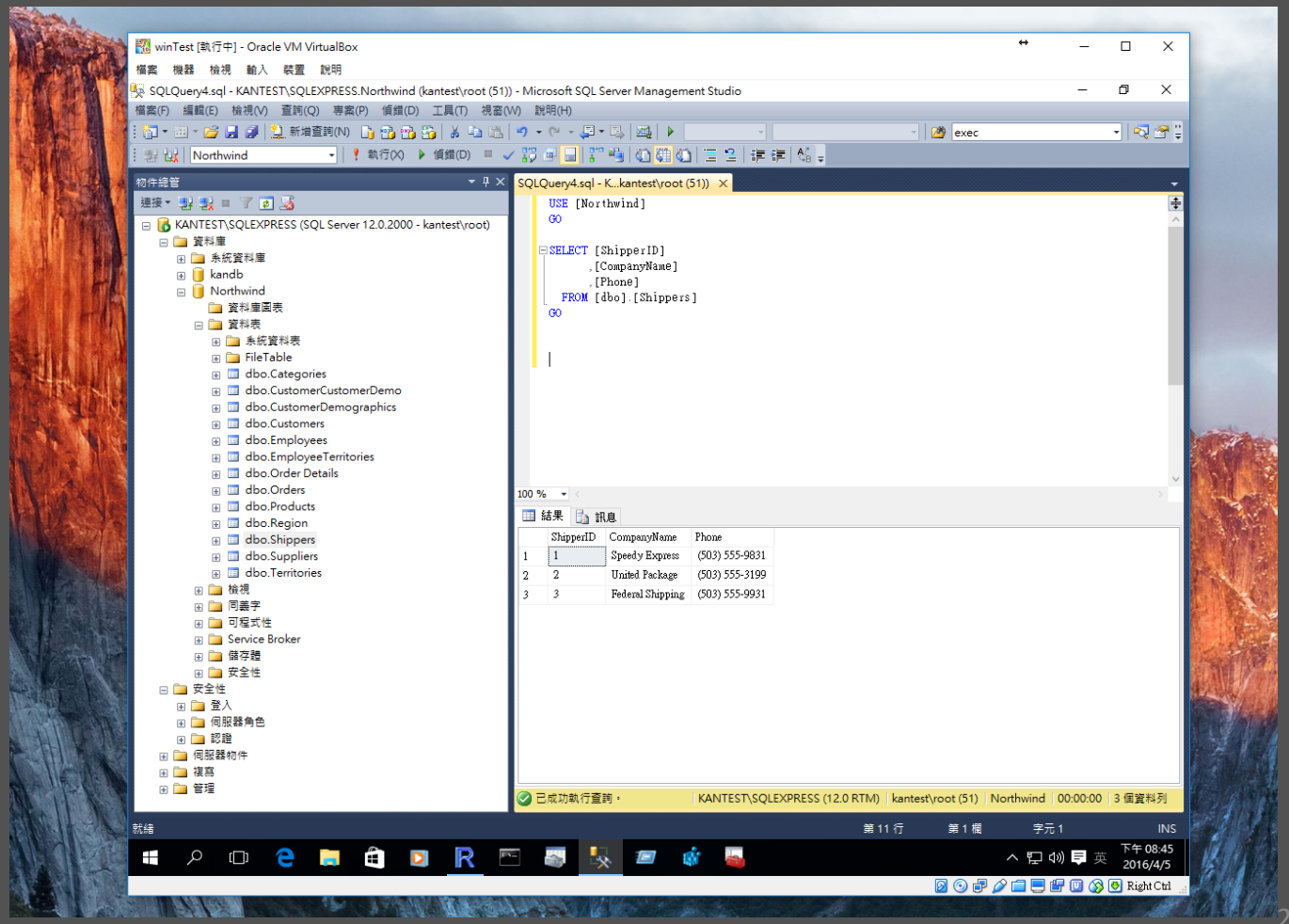
基本上可以使用 sqlQuery () 連線進入 MSSQL 並且使用 SQL，head () 可以檢視 table 的內容。

```
> table(ordtable$ShipCountry)

  Argentina      Austria      Belgium       Brazil       Canada      Denmark      Finland       France      Germany      Ireland        Italy
         16           40           19           83           30           18           22           77          122           19           28
     Mexico       Norway       Poland     Portugal        Spain       Sweden  Switzerland           UK          USA    Venezuela
         28            6            7           13           23           37           18           56          122           46
> mean(ordtable$Freight)
[1] 78.2442
> odbcClose(sdb)
>
```

```
ordtable  = sqlQuery(sdb, "SELECT * FROM  dbo.Orders", stringsAsFactors = FALSE)
class(ordtable)
names(ordtable)
head(ordtable,n=3)
table(ordtable$ShipCountry)
mean(ordtable$Freight)
odbcClose(sdb)
```

R ODBC MS SQL Server

使用 R 利用 RODBC 對 MS SQL 的 Northwind 資料庫進行新增
這是這回所要利用的表 -> dbo.Shippers



R ODBC MS SQL Server

跟前面查詢一樣，利用 ODBC 與 RODBC 輸入帳號登入 MSSQL

```
> require(RODBC)
Loading required package: RODBC
> sdb = odbcConnect("R_SQLServ")
> ordtable = sqlQuery(sdb, "SELECT * FROM  dbo.Shippers", stringsAsFactors = FALSE)
> ordtable
  ShipperID      CompanyName          Phone
1         1   Speedy Express (503) 555-9831
2         2   United Package (503) 555-3199
3         3 Federal Shipping (503) 555-9931
> dim(ordtable)[1]
[1] 3
> names(ordtable)
[1] "ShipperID"   "CompanyName" "Phone"
>
```

在此使用 R 新增 SQL 對其 table 增加一筆資料

```
> insert.sql = paste("INSERT INTO dbo.Shippers", "(CompanyName, Phone) ", "VALUES", "(", "'WEPA',", "'7654321'", ")")
> sqlQuery(sdb, insert.sql)
character(0)
>
```

R ODBC MS SQL Server

成功

```
> ordtabletest = sqlQuery(sdb, "SELECT * FROM dbo.Shippers", stringsAsFactors = FALSE)
> ordtabletest
  ShipperID      CompanyName          Phone
1         1   Speedy Express (503) 555-9831
2         2   United Package (503) 555-3199
3         3 Federal Shipping (503) 555-9931
4         4             WEPA        7654321
>
```

odbcClose() -> 掰 !!!

```
> ordtabletest = sqlQuery(sdb, "SELECT * FROM dbo.Shippers", stringsAsFactors = FALSE)
> ordtabletest
  ShipperID      CompanyName          Phone
1         1   Speedy Express (503) 555-9831
2         2   United Package (503) 555-3199
3         3 Federal Shipping (503) 555-9931
4         4             WEPA        7654321
>
>
> odbcClose(sdb)
>
```

```
require(RODBC)
sdb = odbcConnect("R_SQLServ")
ordtable = sqlQuery(sdb,
                    "SELECT * FROM  dbo.Shippers",
                    stringsAsFactors = FALSE)
ordtable
dim(ordtable)[1]
names(ordtable)
insert.sql = paste("INSERT INTO
dbo.Shippers",
                   "(CompanyName, Phone) ",
                   "VALUES", "(", "'WEPA',", "'7654321'",
")")
sqlQuery(sdb, insert.sql)
ordtabletest = sqlQuery(sdb,
                        "SELECT * FROM dbo.Shippers",
                        stringsAsFactors = FALSE)
ordtabletest
odbcClose(sdb)
```

R MariaDB 與 RMYSQL套件設定 by Windows

Rtool
https://cran.r-project.org/bin/windows/Rtools/

Rtools Downloads

Some of the tools are incompatible with obsolete versions of R. We maintain one actively updated version of the tools, and other "frozen" snapshots of them. We recor
release of R.

The current version of this file is recorded here: VERSION.txt.

Download	R compatibility	Frozen?
Rtools34.exe	R 3.3.x and later	No
Rtools33.exe	R 3.2.x to 3.3.x	Yes
Rtools32.exe	R 3.1.x to 3.2.x	Yes
Rtools31.exe	R 3.0.x to 3.1.x	Yes

R MariaDB 與 RMYSQL套件設定 by Windows

Change History

Changes since R 3.3.0

The version number has been updated to 3.4.x.y.

Support for the gcc 4.6.3 toolchain has been dropped.

We have updated Tcl/TK to version 8.6.4. If you are using Rtools3

TCL_VERSION = 85

to

TCL_VERSION = 86

in R_HOME/src/gnuwin32/fixed/etc/Makeconf.

Changes since R 3.2.2

Both the gcc 4.6.3 toolchain and a toolchain based on gcc 4.9.3 an
compilers are selected.

Changes since R 3.1.3

Rtool
請根據 Rtool 來找 R 的版本

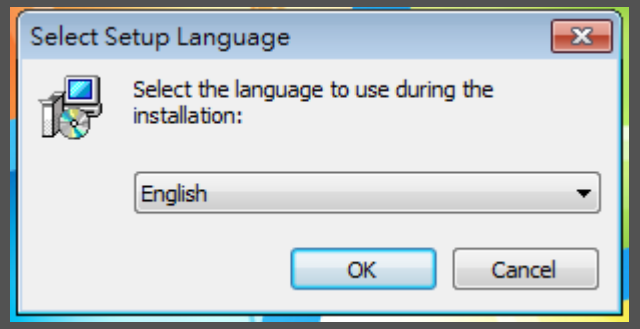
R MariaDB 與 RMYSQL套件設定 by Windows

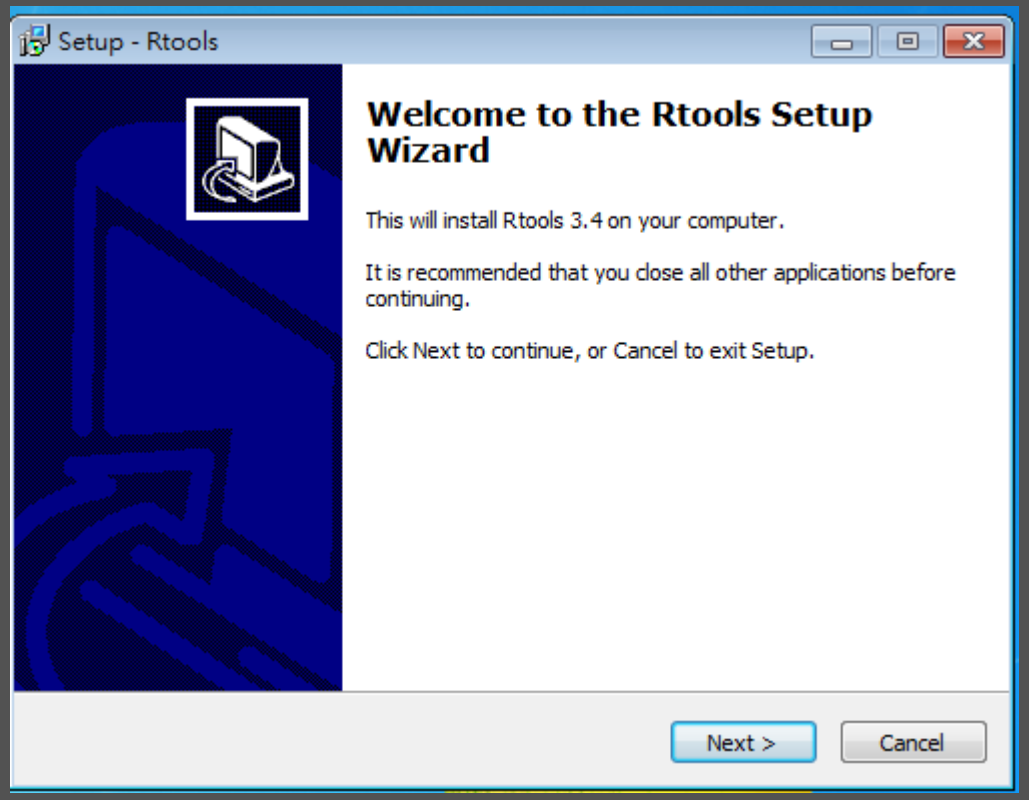
MariaDB - https://mariadb.org/

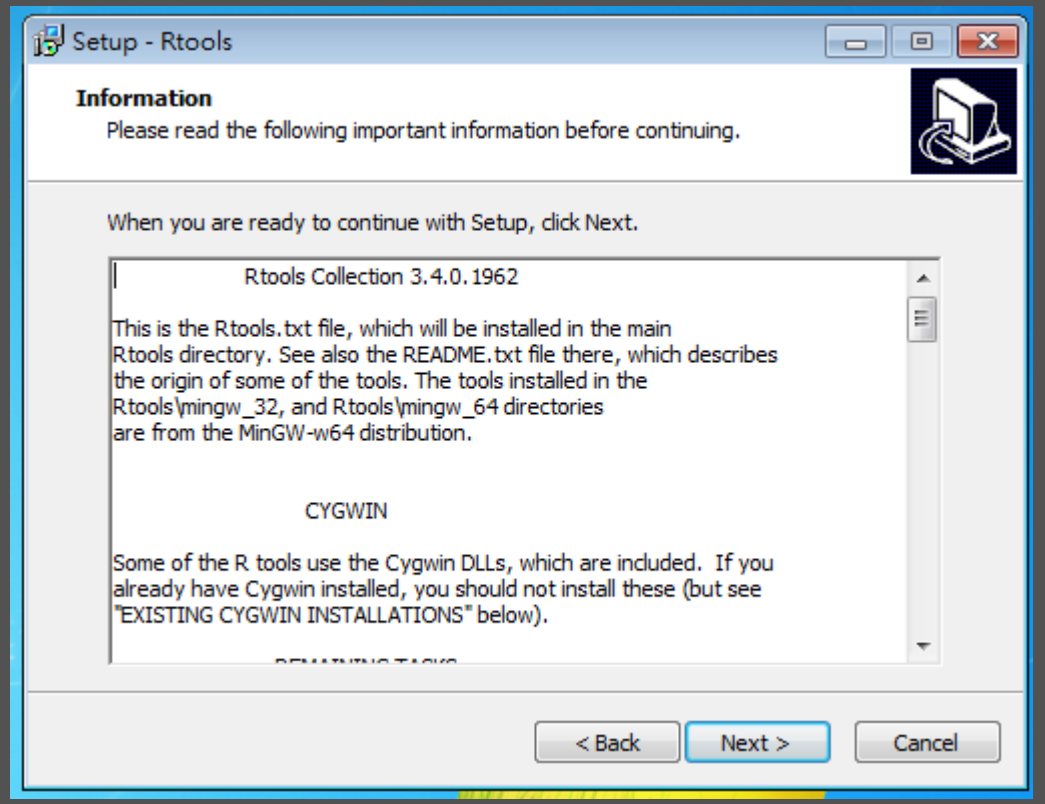
進入下載後選擇 MariaDB 5.5 Series 的版本

R MariaDB 與 RMYSQL套件設定 by Windows

Rtool 安裝
下一步或用預設即可 ...

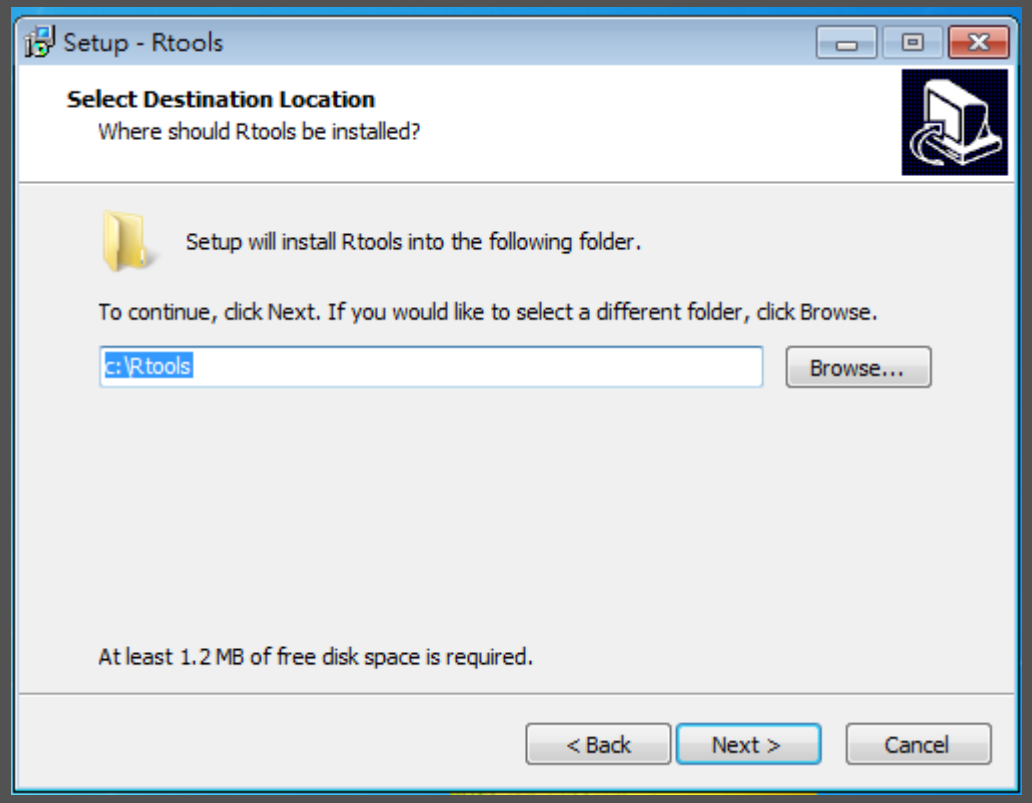


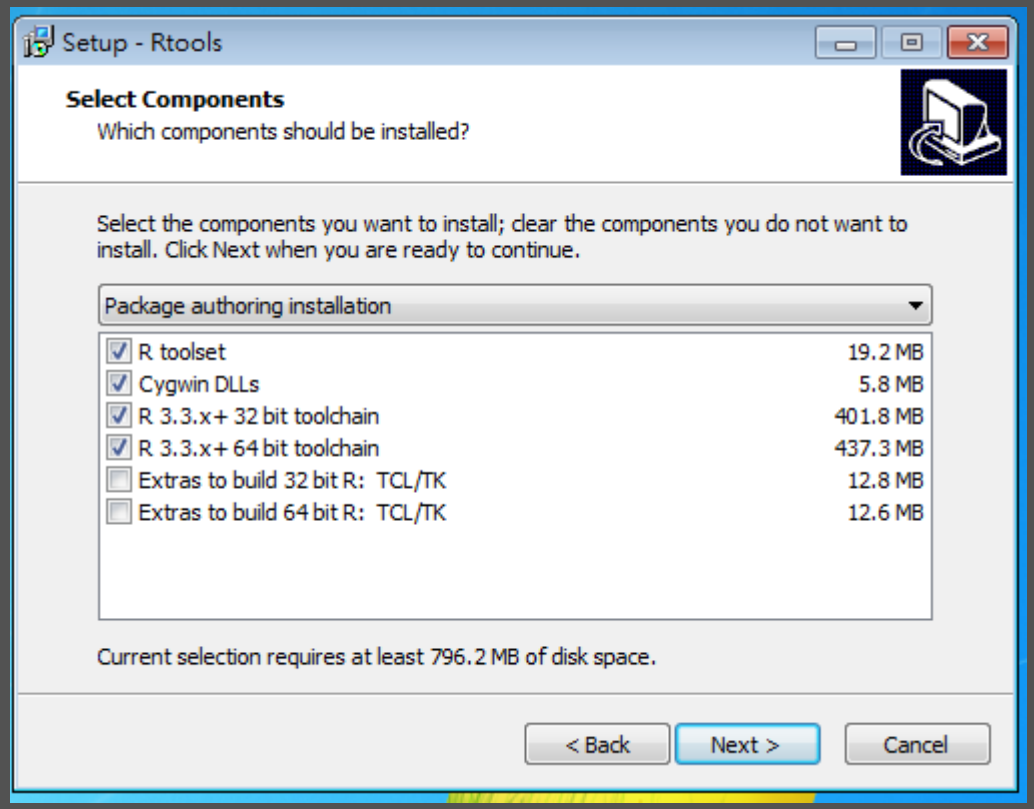




R MariaDB 與 RMYSQL套件設定 by Windows

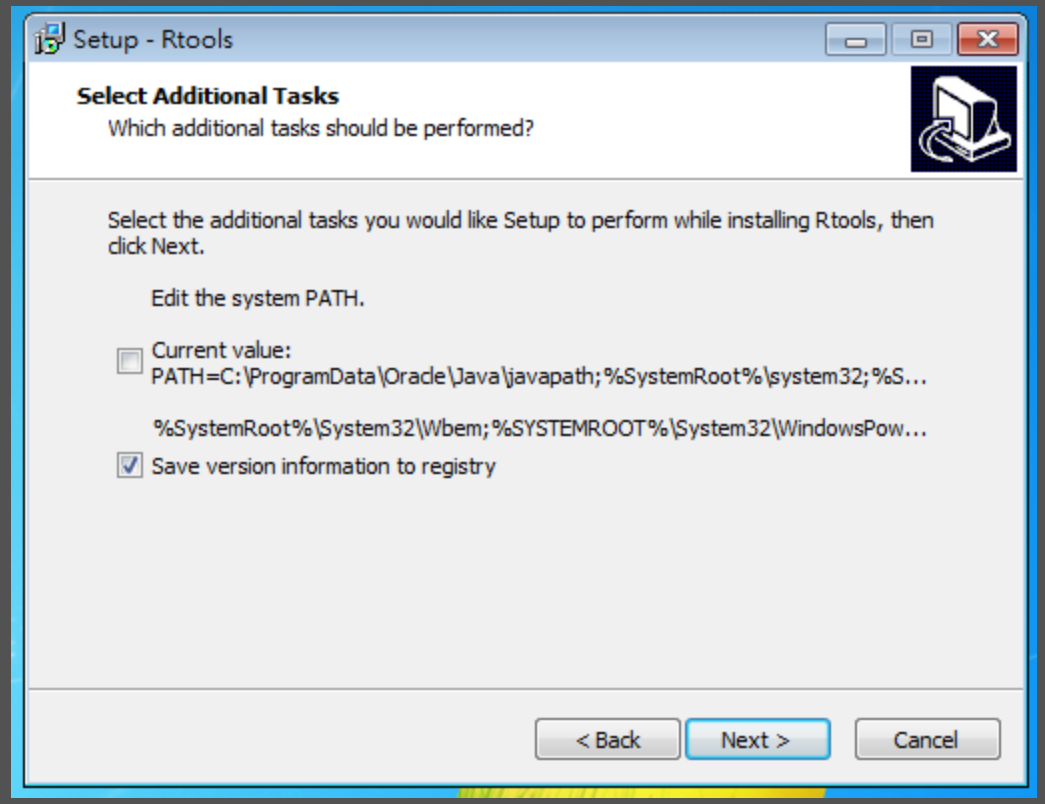
Rtool 安裝
下一步或用預設即可 ...

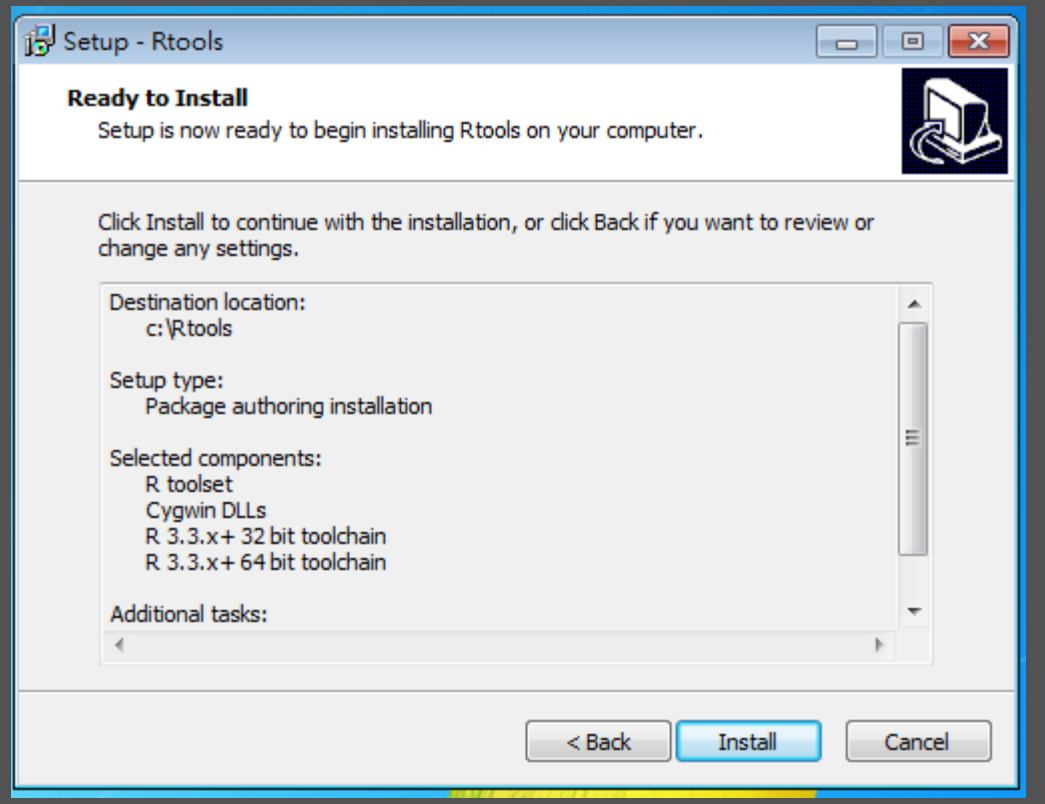




R MariaDB 與 RMYSQL套件設定 by Windows

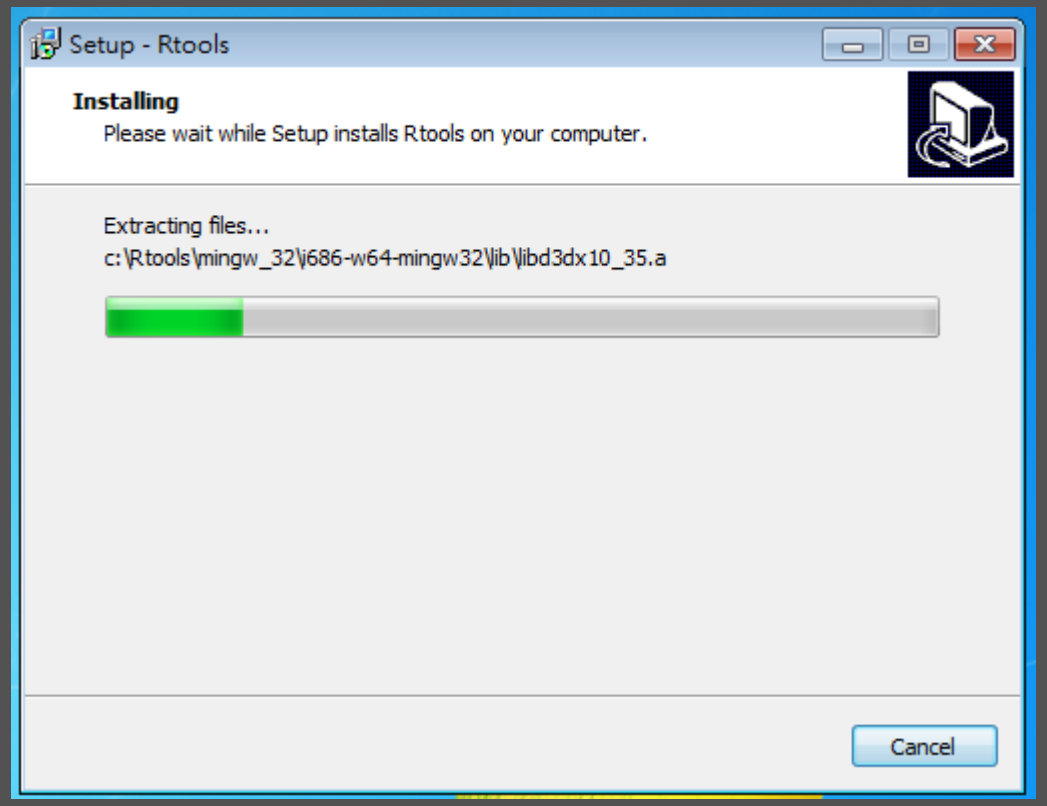
Rtool 安裝
下一步或用預設即可 ...

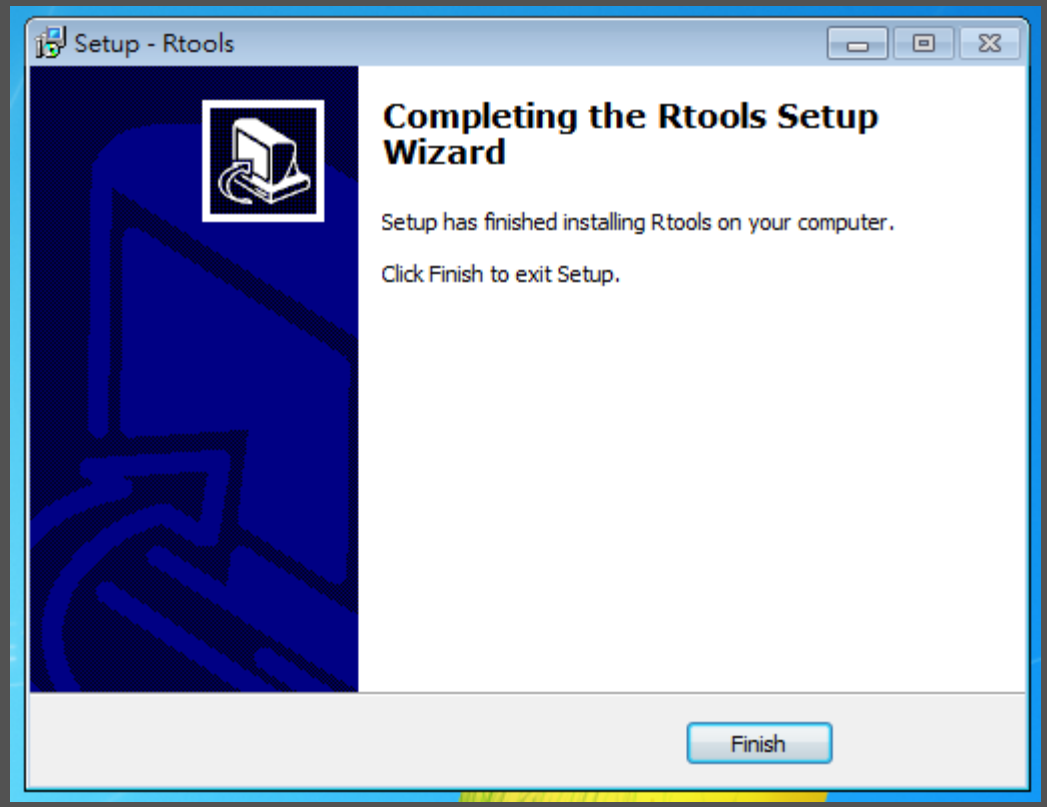




R MariaDB 與 RMYSQL套件設定 by Windows

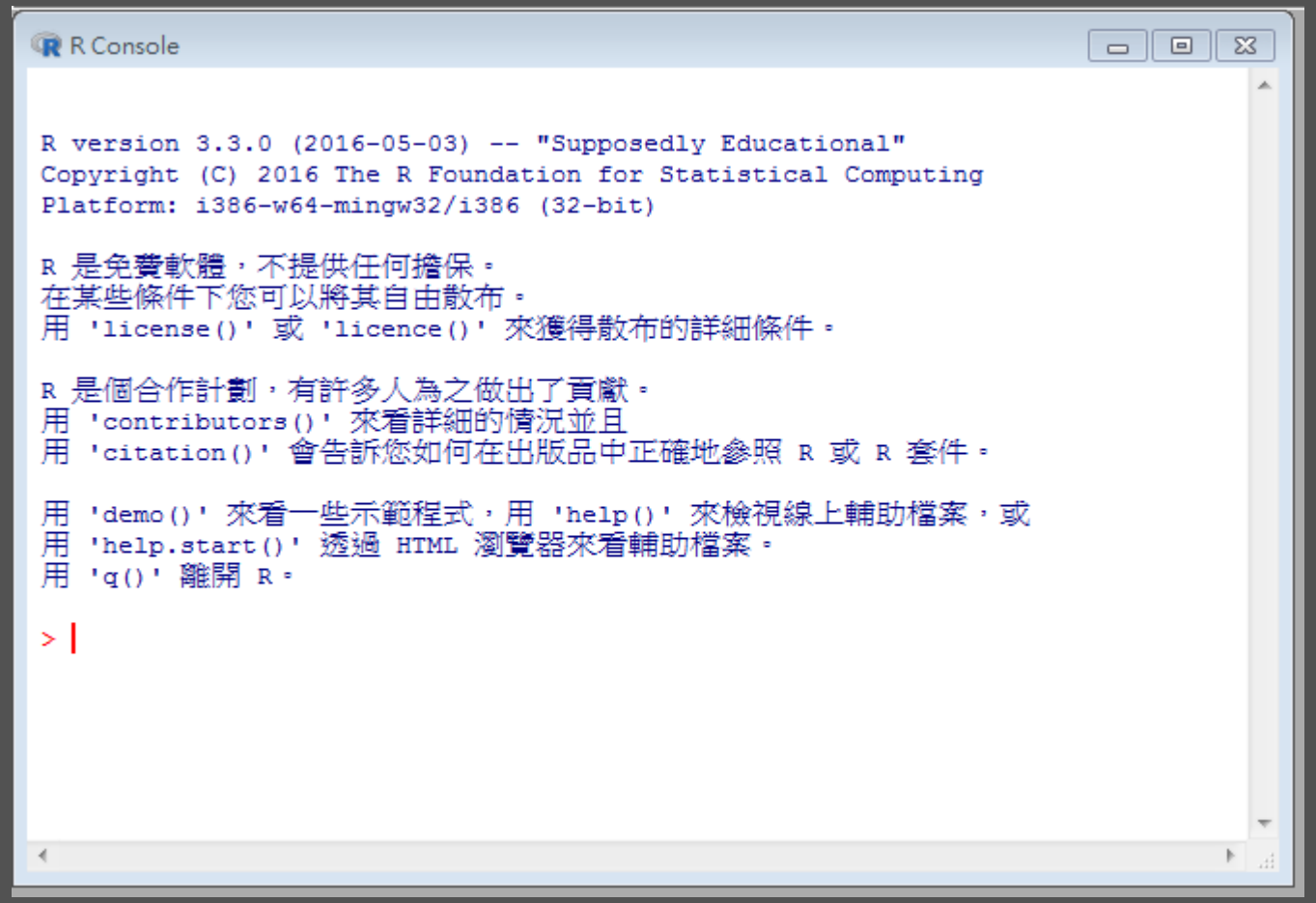
Rtool 安裝
下一步或用預設即可 ...





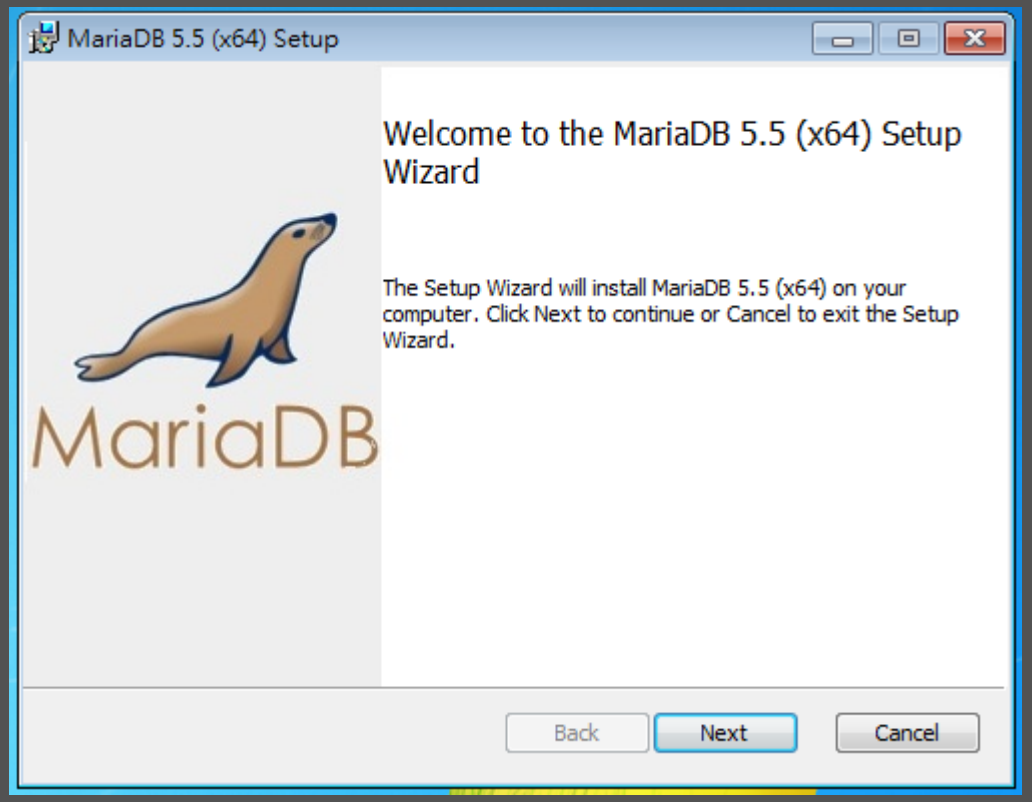
R MariaDB 與 RMYSQL套件設定 by Windows

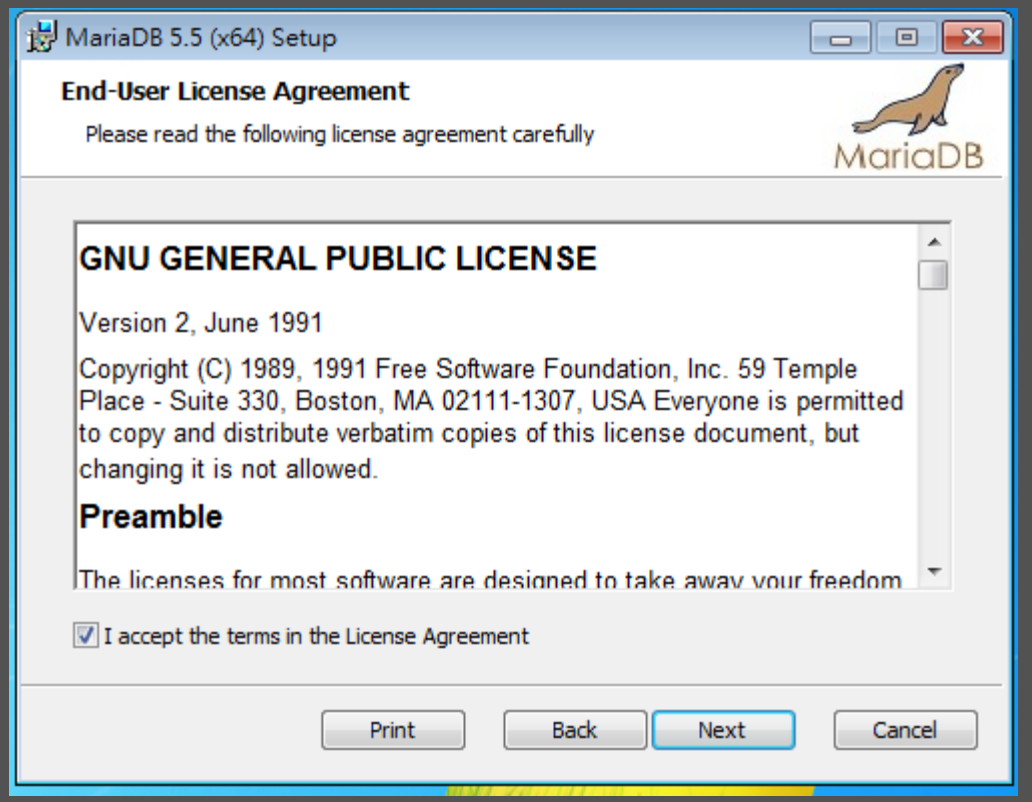
R
安裝細節不難也是下一步即可，這裡要用 32bit 的部分去玩



R MariaDB 與 RMYSQL套件設定 by Windows

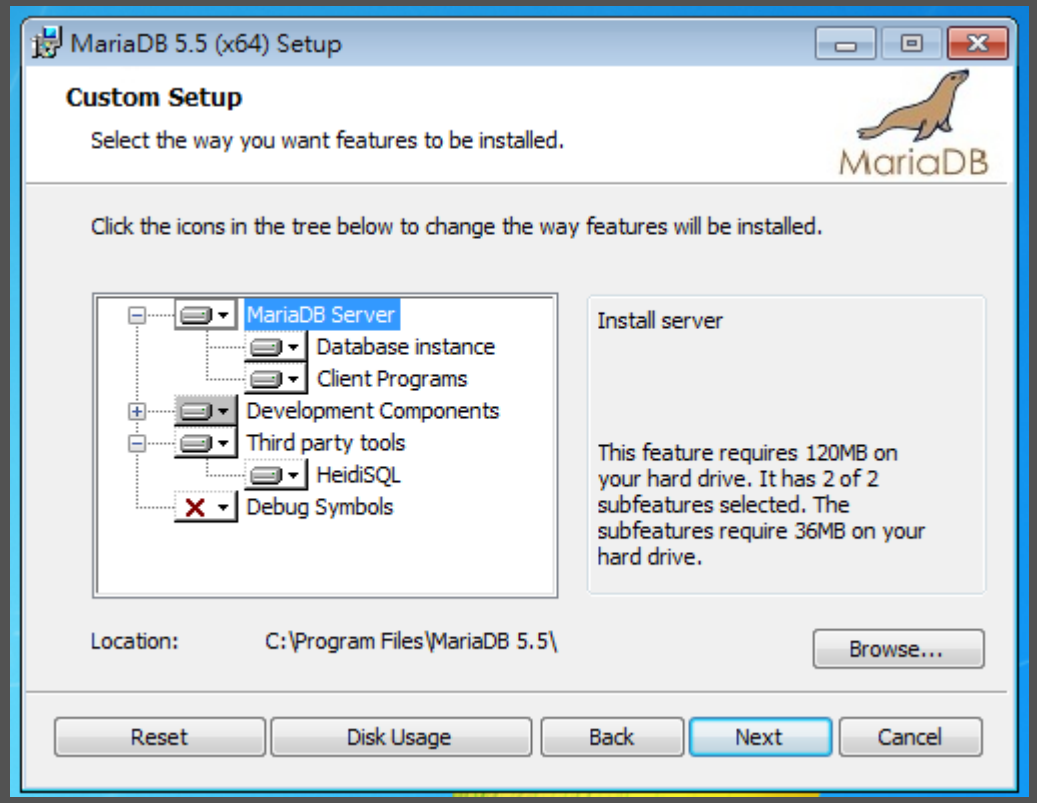
MariaDB
資料庫帳密設定與文字編碼的地方要注意，因為後面我們要用。

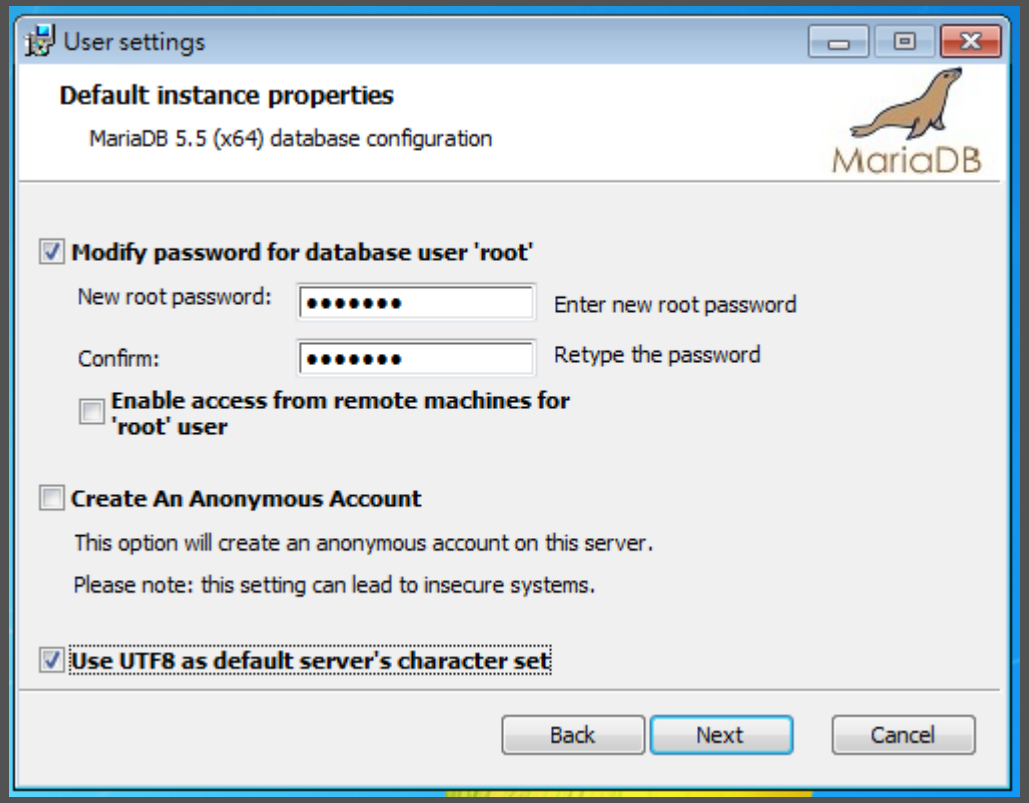




R MariaDB 與 RMYSQL套件設定 by Windows

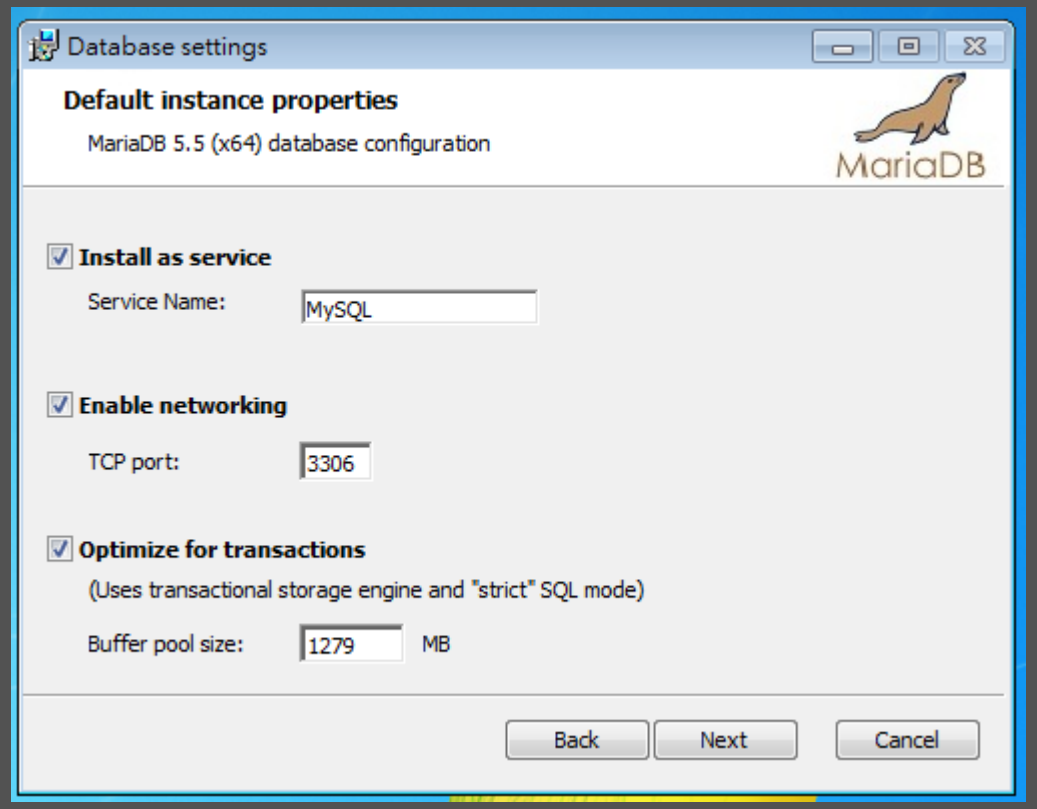
MariaDB
這裡要注意設定資料庫的密碼，我在這裡設定UTF8編碼。

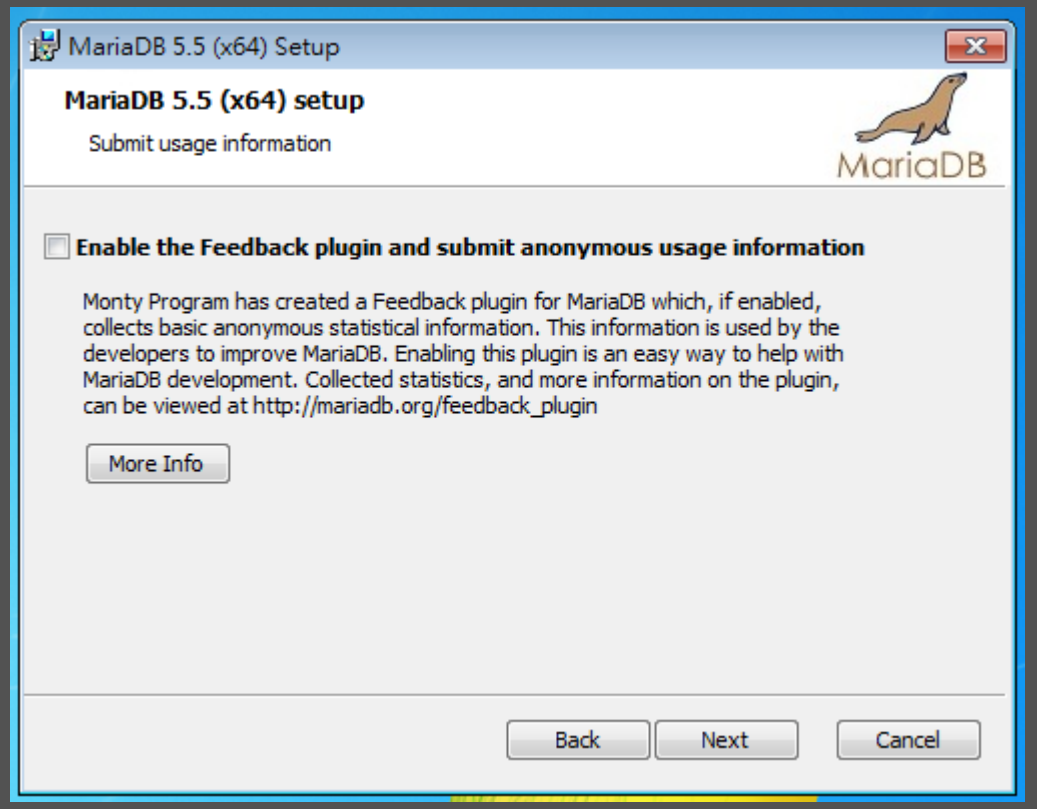




R MariaDB 與 RMYSQL套件設定 by Windows

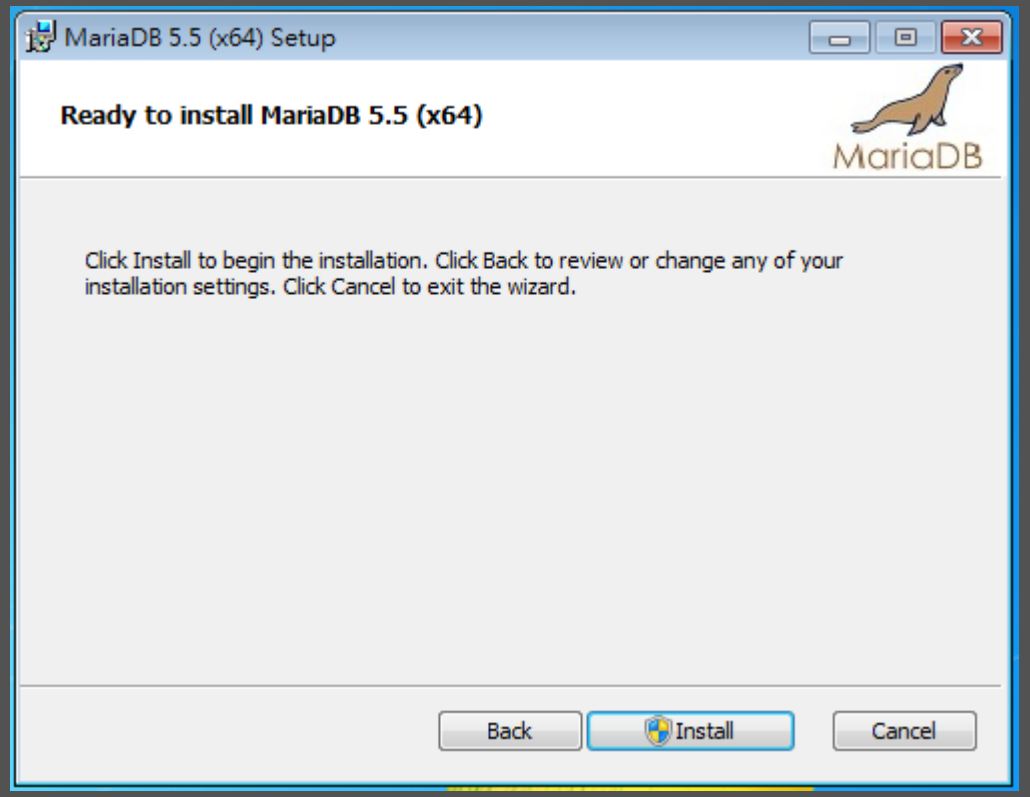
MariaDB

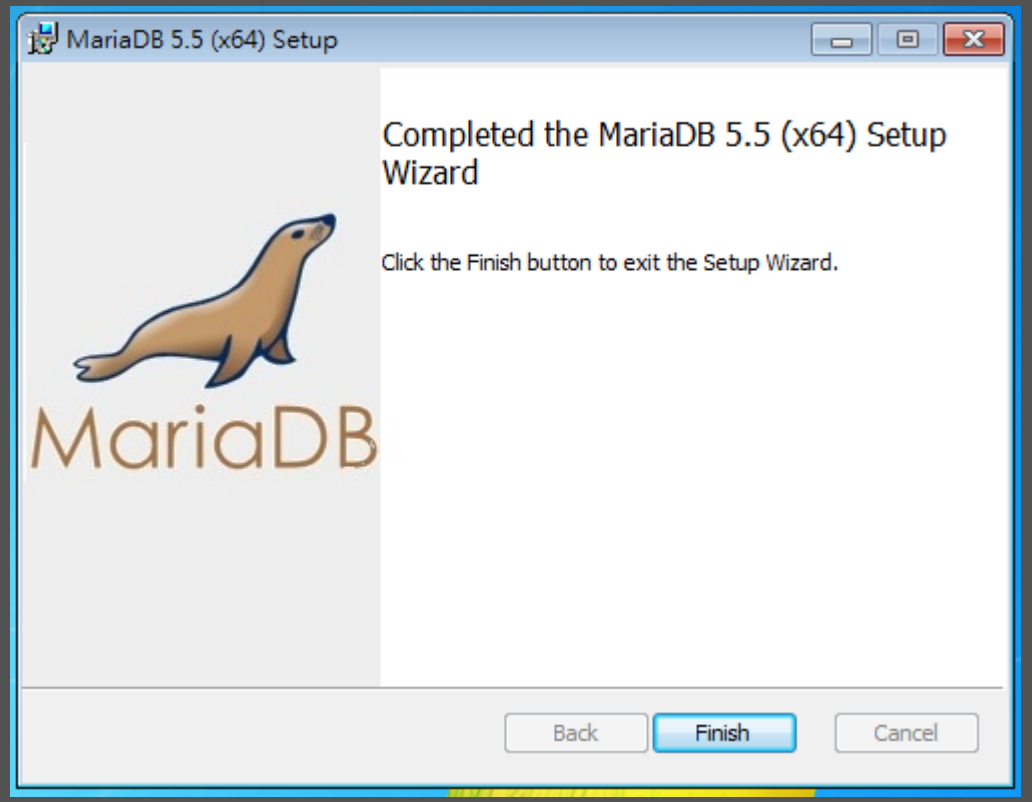




R MariaDB 與 RMYSQL套件設定 by Windows

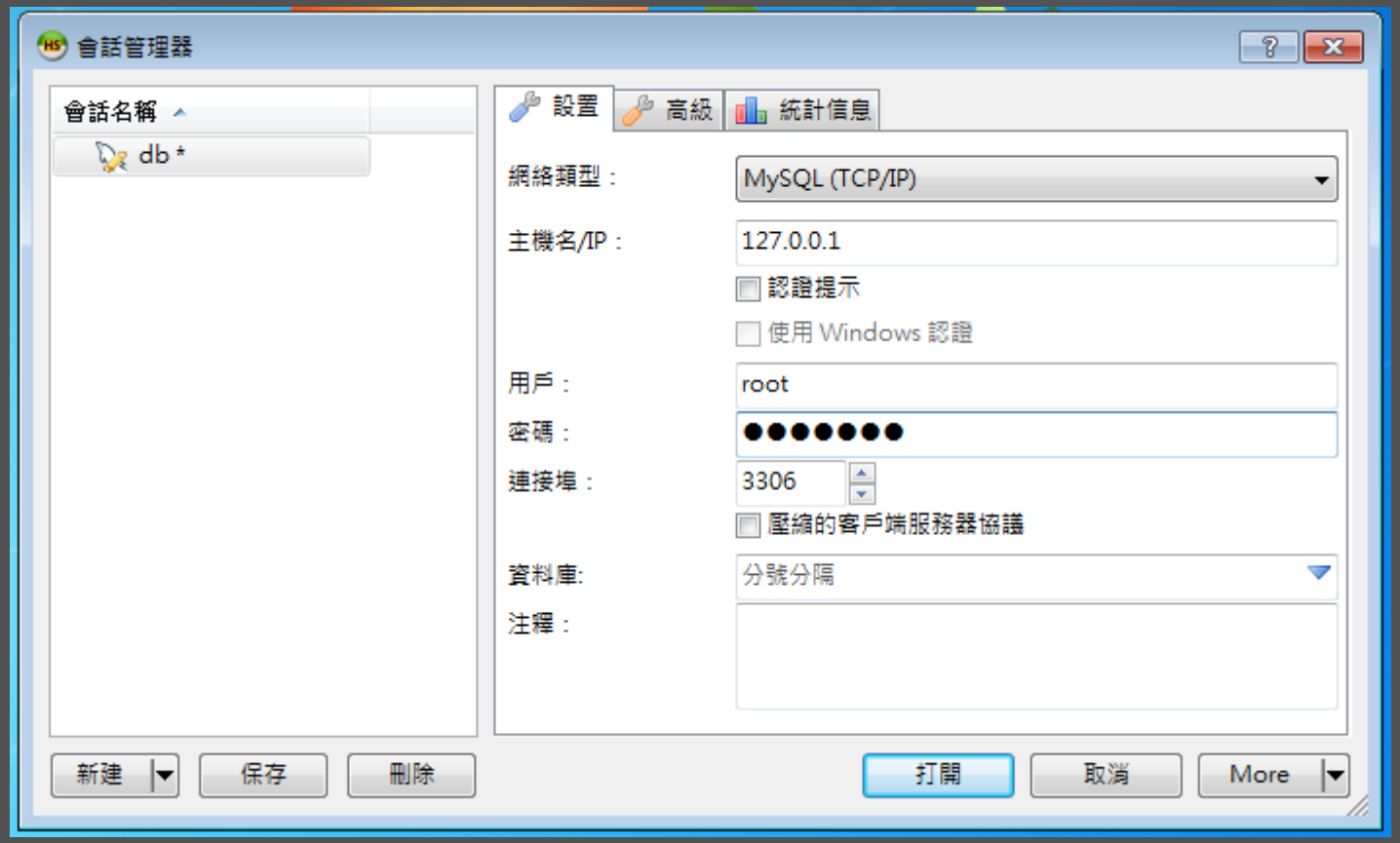
MariaDB





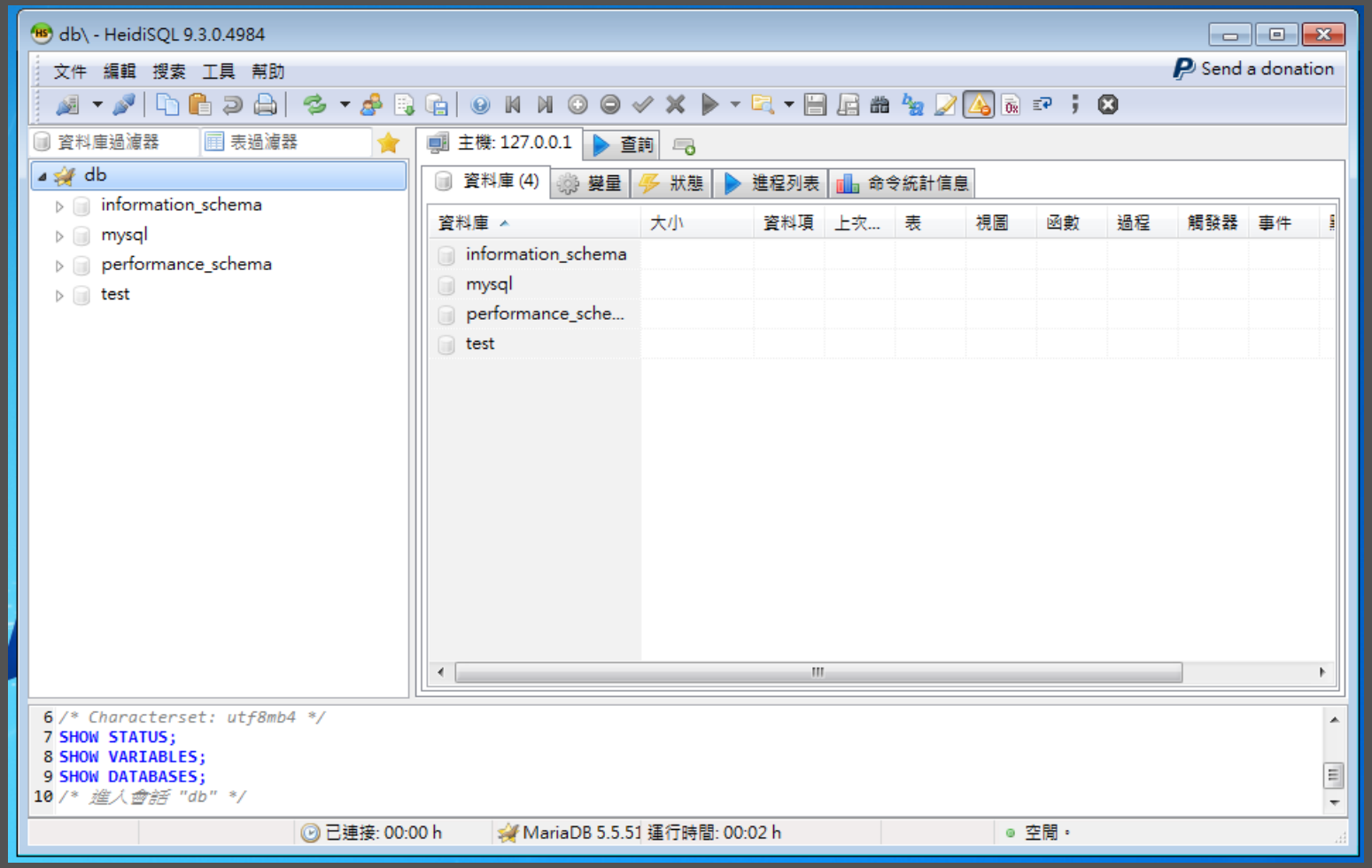
R MariaDB 與 RMYSQL套件設定 by Windows

MariaDB
在這裡我們用安裝 MariaDB 中就有的介面，HeidiSQL 新增一個會話名稱輸入剛剛設定的密碼即可登入。



R MariaDB 與 RMYSQL套件設定 by Windows

MariaDB
資料庫 OK!!!



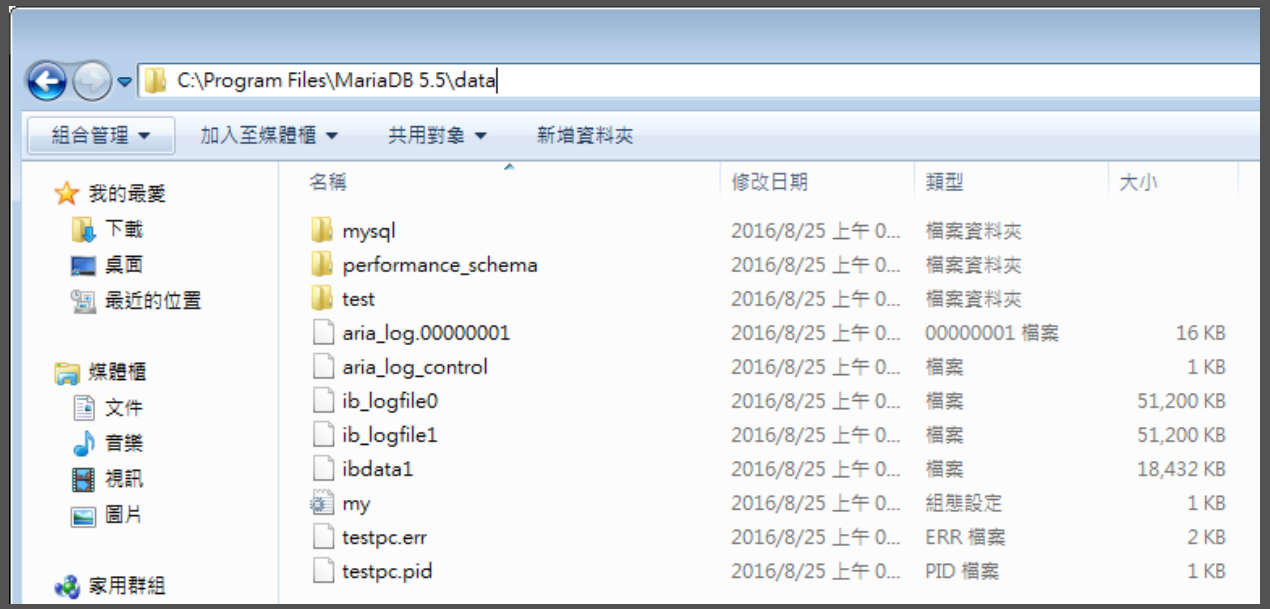
R MariaDB 與 RMYSQL套件設定 by Windows

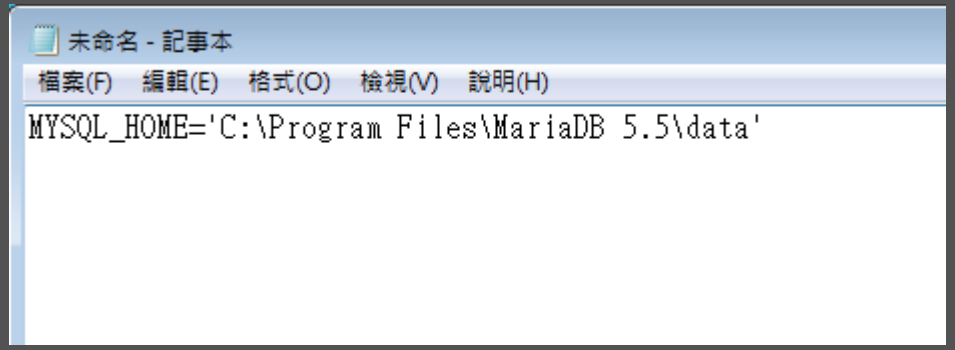
Renviron.site
接下來要設定在 R 3.3.0 下面的 /etc 目錄新增一個名為 Renviron.site 的檔案，我們可以使用任何編輯器去做(為了方便就直接用記事本了)

Renviron.site 內容為

MYSQL_HOME='MariaDB路徑'

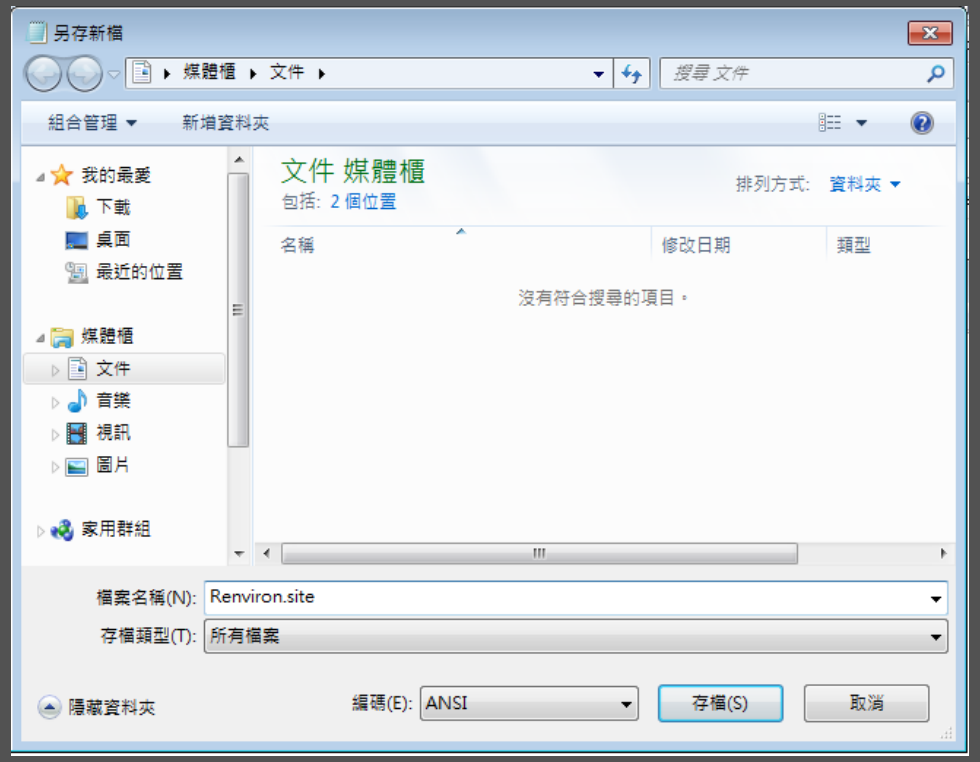
其實就是在 C槽 Program Files 安裝的 MariaDB 下面的 /data 目錄，完成後就放到其版本下的 /etc 目錄....

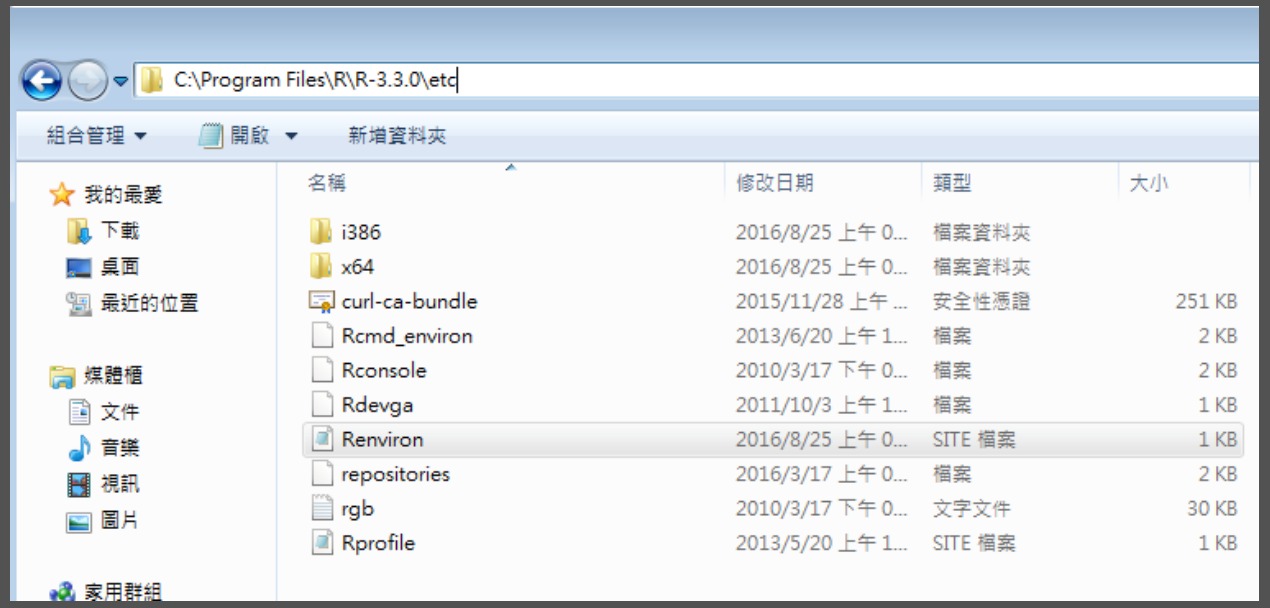




R MariaDB 與 RMYSQL套件設定 by Windows

Renviron.site



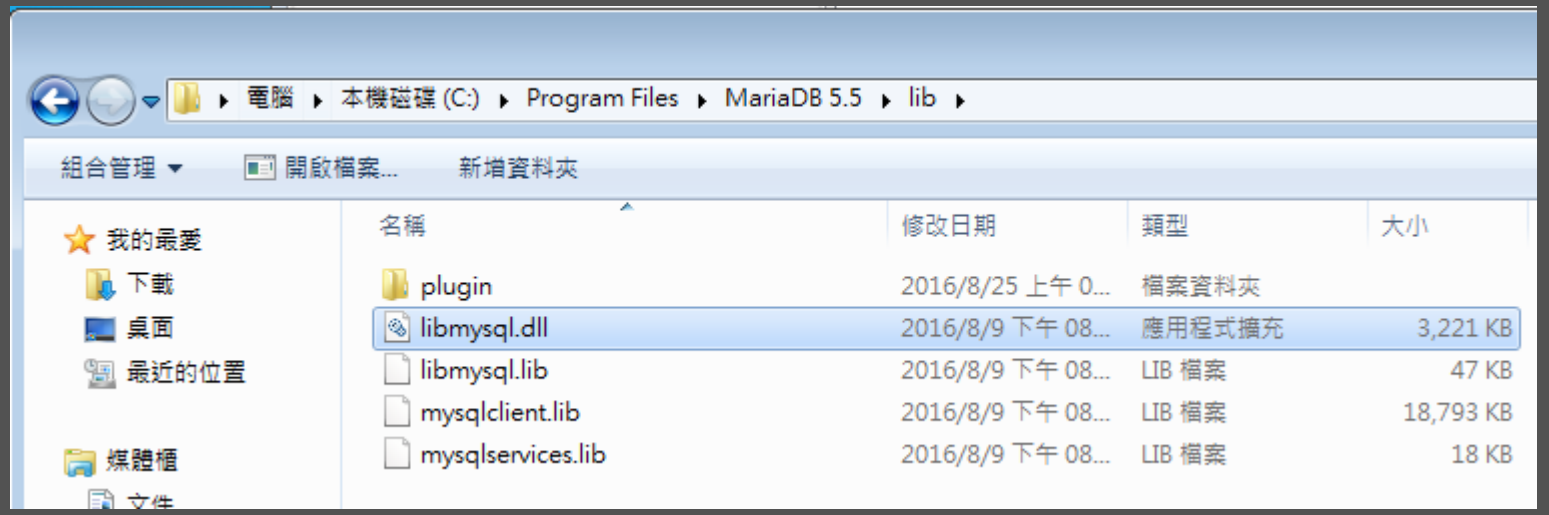


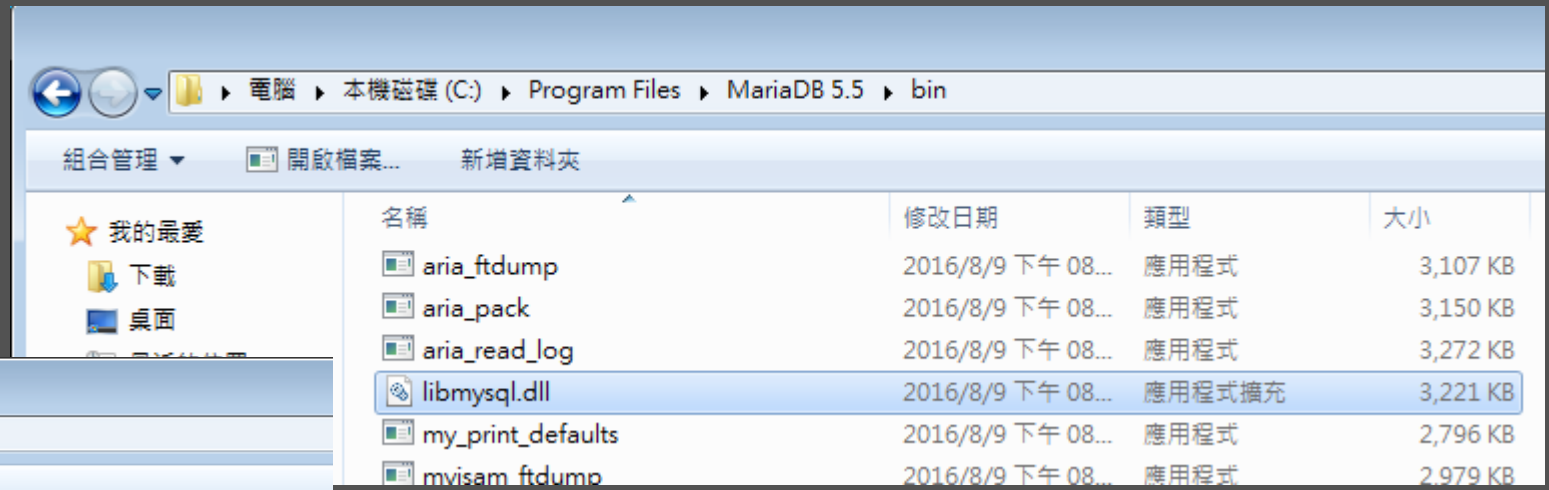
R MariaDB 與 RMYSQL套件設定 by Windows

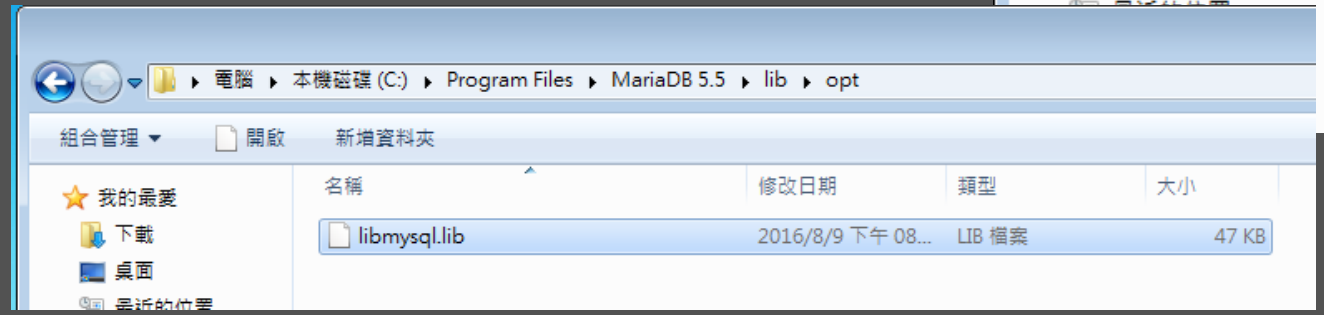
MariaDB 的設定

1. 將 MariaDB 下 /lib 目錄中的 libmysql.dll 複製至 /bin 目錄之中
2. 將 MariaDB 下 /lib 目錄中的 libmysql.lib 複製至 /lib/opt 目錄之下

...由於沒有 /opt 目錄所以直接建一個







R MariaDB 與 RMYSQL套件設定 by Windows

完成
想要知道前面 Renviron.site 有無成功可用Sys.getenv('MYSQL_HOME')

Sys.getenv('MYSQL_HOME')

```
> Sys.getenv('MYSQL_HOME')
[1] "C:\\Program Files\\MariaDB 5.5\\data"
>
```

安裝 RMySQL 套件
install.packages("RMySQL")

```
> install.packages("RMySQL")
Installing package into 'C:/Users/test/Documents/R/win-library/3.3'
(as 'lib' is unspecified)
嘗試 URL 'https://cran.usthb.dz/bin/windows/contrib/3.3/RMySQL_0.10.9.zip'
Content type 'application/zip' length 1914362 bytes (1.8 MB)
downloaded 1.8 MB

package 'RMySQL' successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\test\AppData\Local\Temp\RtmpgFzybL\downloaded_packages
>
```

R MariaDB 與 RMYSQL套件設定 by Windows

DB

```
CREATE DATABASE school;
SHOW DATABASES;
USE school;
CREATE TABLE stdscore
(stdscoreid int auto_increment primary key,
stdno char(7),
name char(50),
birthdate date,
courseno char(6),
courname char(50),
teacher char(50),
score int);

SHOW TABLES;

INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
VALUES('9643001', 'Linda', '1982/1/15', 'MS1038', 'Statistics', 'Henry Chen', 88);
INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
VALUES('9643001', 'Linda', '1982/1/15', 'MS1014', 'Data Structure', 'James Lee', 82);
INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
VALUES('9643018', 'Tracy', '1982/11/18', 'MS1014', 'Data Structure', 'James Lee', 77);

INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
VALUES('9643025', 'Tom', '1982/9/17', 'MS1038', 'Statistics', 'Henry Chen', 65);
SELECT * FROM stdscore;
```

主機: 127.0.0.1 | 查詢*

```
1  CREATE DATABASE school;
2  SHOW DATABASES;
3  USE school;
4  CREATE TABLE stdscore
5  (stdscoreid int auto_increment primary key,
6  stdno char(7),
7  name char(50),
8  birthdate date,
9  courseno char(6),
10 courname char(50),
11 teacher char(50),
12 score int);
13
14 SHOW TABLES;
15
16 INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
17 VALUES('9643001', 'Linda', '1982/1/15', 'MS1038', 'Statistics', 'Henry Chen', 88);
18 INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
19 VALUES('9643001', 'Linda', '1982/1/15', 'MS1014', 'Data Structure', 'James Lee',
20 82);
21 INSERT INTO stdscore (stdno, name, birthdate, courseno, courname, teacher, score)
22 VALUES('9643018', 'Tracy', '1982/11/18', 'MS1014', 'Data Structure', 'James Lee',
23 77);
```

SCHEMATA (1×5) | TABLE_NAMES (1×1)

Database
information_schema
mysql
performance_schema
school
test

R MariaDB 與 RMYSQL套件設定 by Windows

R

```
library(RMySQL)
con = dbConnect(MySQL(), user="root", password="hitachi", dbname="school",
host="localhost")
dbListTables(con)
dbListFields(con, "stdscore")
data.all = dbReadTable(con, "stdscore")
class(data.all)
data.all
data.select = dbGetQuery(con, "select * from stdscore where courseno='MS1038'")
data.select
summary(MySQL(), verbose = TRUE)
summary(con, verbose = TRUE)
summary(data.all, verbose = TRUE)
dbListConnections(MySQL())
dbDisconnect(con)
```

```
> library(RMySQL)
Loading required package: DBI
Warning message:
package 'RMySQL' was built under R version 3.3.1
> con = dbConnect(MySQL(), user="root", password="hitachi", dbname="school", host="localhost")
> dbListTables(con)
[1] "stdscore"
> dbListFields(con, "stdscore")
[1] "stdscoreid" "stdno"      "name"       "birthdate"  "courseno"   "courname"   "teacher"    "score"
> data.all = dbReadTable(con, "stdscore")
> class(data.all)
[1] "data.frame"
> data.all
  stdscoreid   stdno  name  birthdate courseno       courname    teacher score
1          1 9643001 Linda 1982-01-15   MS1038     Statistics Henry Chen    88
2          2 9643001 Linda 1982-01-15   MS1014 Data Structure  James Lee    82
3          3 9643018 Tracy 1982-11-18   MS1014 Data Structure  James Lee    77
> data.select = dbGetQuery(con, "select * from stdscore where courseno='MS1038'")
> data.select
  stdscoreid   stdno  name  birthdate courseno   courname    teacher score
1          1 9643001 Linda 1982-01-15   MS1038 Statistics Henry Chen    88
```

R MariaDB 與 RMYSQL套件設定 by Ubuntu Linux

更新與安裝(在此之前要先裝好 R、Ubuntu Linux (LAMP))

~$ sudo apt-get update
~$ sudo apt-get install r-cran-rmysql

R MariaDB 與 RMYSQL套件設定 by Ubuntu Linux

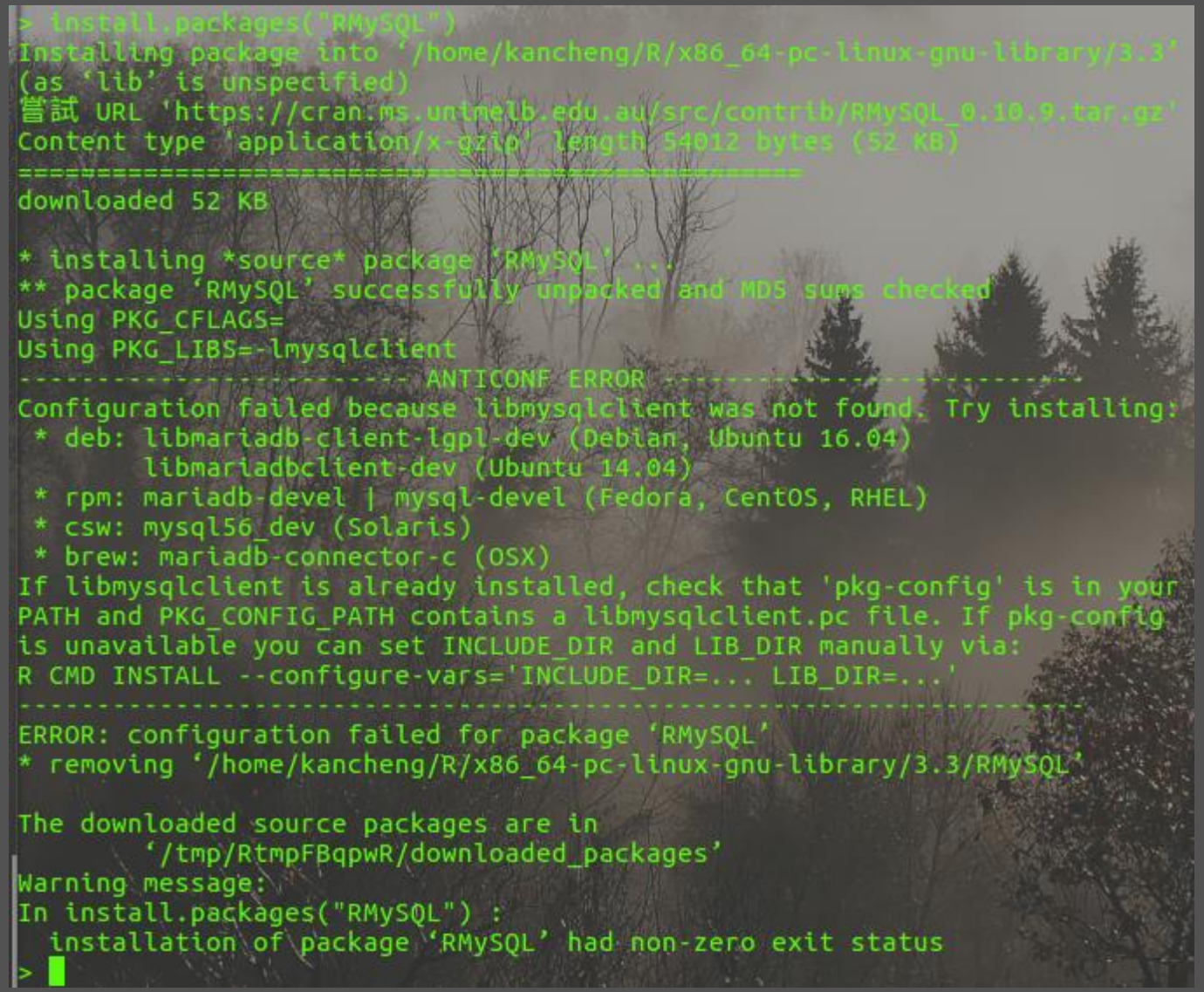
安裝 RMySQL 套件

install.packages("RMysql")

根據上述的訊息....

安裝 libmariadb-client-lgpl-dev 套件，並找出 /tmp/RtmpFBqpwR/downloaded_packages 下的 RMySQL 與 DB目錄，並對 R 做設定。

/tmp/Rtmp******/downloaded_packages



R MariaDB 與 RMYSQL套件設定 by Ubuntu Linux

安裝 RMySQL 套件

~$ sudo apt-get install libmariadb-client-lgpl-dev -y

~$ ls /tmp/RtmpFBqpwR/downloaded_packages

~$ whereis mysql

~$ R CMD INSTALL --configure-args='--with-mysql-dir=/usr/lib/mysql'
/tmp/RtmpFBqpwR/downloaded_packages/RMySQL_0.10.9.tar.gz

```
kancheng@ubndjsrserv:~$ sudo apt-get install libmariadb-client-lgpl-dev -y
正在讀取套件清單... 完成
正在重建相依關係
正在讀取狀態資料... 完成
以下套件為自動安裝，並且已經無用：
  libcdaudio1 libdirectfb-1.2-9 libenca0 libmpcdec6 libslv2-9
Use 'sudo apt autoremove' to remove them.
下列【新】套件將會被安裝：
  libmariadb-client-lgpl-dev
升級 0 個，新安裝 1 個，移除 0 個，有 0 個未被升級。
```

```
kancheng@ubndjsrserv:~$ ls /tmp/RtmpFBqpwR/downloaded_packages
RMySQL_0.10.9.tar.gz
kancheng@ubndjsrserv:~$ whereis mysql
mysql: /usr/bin/mysql /usr/lib/mysql /etc/mysql /usr/share/mysql /usr/share/man/man1/mysql.1.gz
kancheng@ubndjsrserv:~$
kancheng@ubndjsrserv:~$ R CMD INSTALL --configure-args='--with-mysql-dir=/usr/lib/mysql' /tmp/RtmpFBqp
wR/downloaded_packages/RMySQL_0.10.9.tar.gz
* installing to library ‘/home/kancheng/R/x86_64-pc-linux-gnu-library/3.3’
* installing *source* package ‘RMySQL’ ...
** package ‘RMySQL’ successfully unpacked and MD5 sums checked
Found mysql_config cflags and libs!
Using PKG_CFLAGS=-I/usr/include/mariadb -g -O2 -fstack-protector-strong -Wformat -Werror=format-securi
ty -D_FORTIFY_SOURCE=2  -Wunused -Wno-uninitialized
Using PKG_LIBS=-L/usr/lib/x86_64-linux-gnu -lmariadb
** libs
```

R MariaDB 與 RMYSQL套件設定 by Ubuntu Linux

進入資料庫，建立之後的測試資料(SQL)

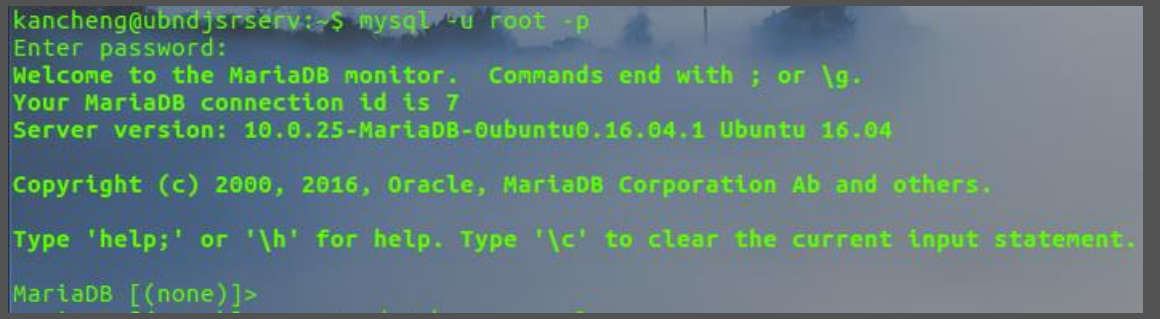
~$ mysql -u root -p

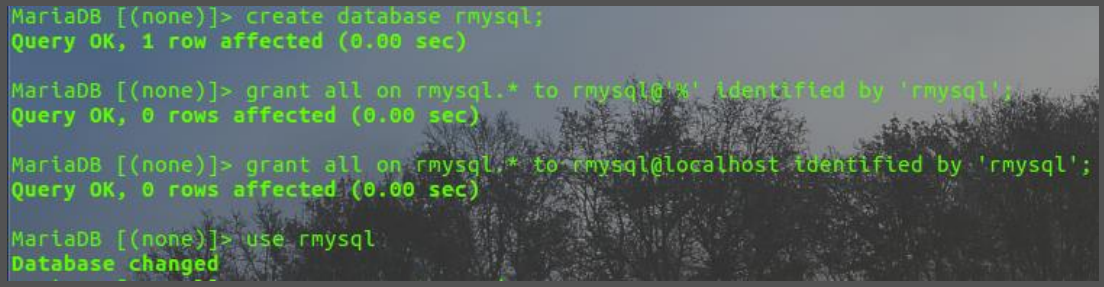
> create database rmysql;
> grant all on rmysql.* to rmysql@'%' identified by 'rmysql';
> grant all on rmysql.* to rmysql@localhost identified by 'rmysql';
> use rmysql

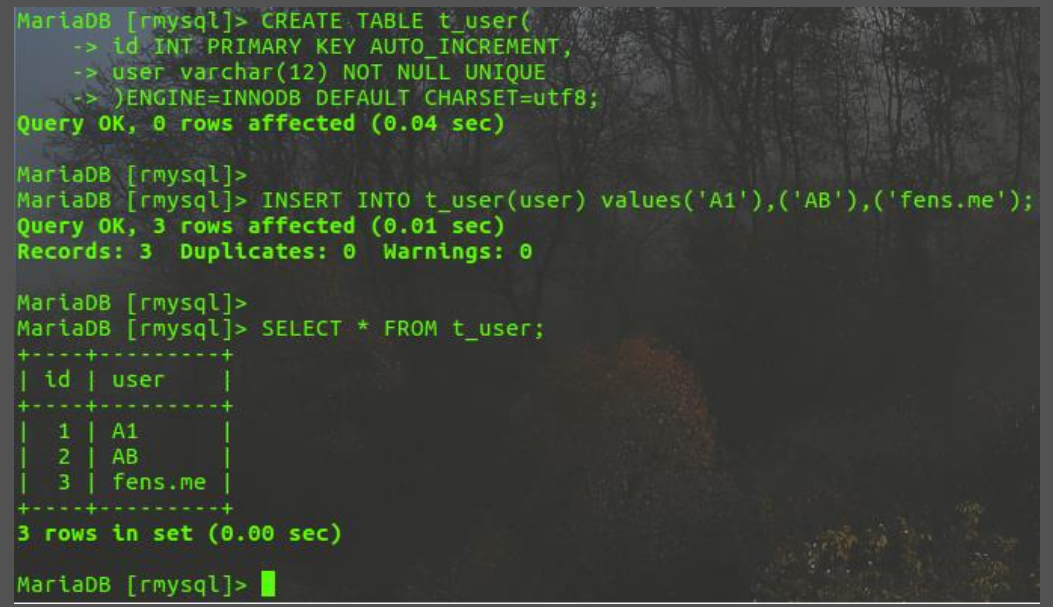
> CREATE TABLE t_user(
id INT PRIMARY KEY AUTO_INCREMENT,
user varchar(12) NOT NULL UNIQUE
)ENGINE=INNODB DEFAULT CHARSET=utf8;

> INSERT INTO t_user(user) values('A1'),('AB'),('fens.me');

> SELECT * FROM t_user;

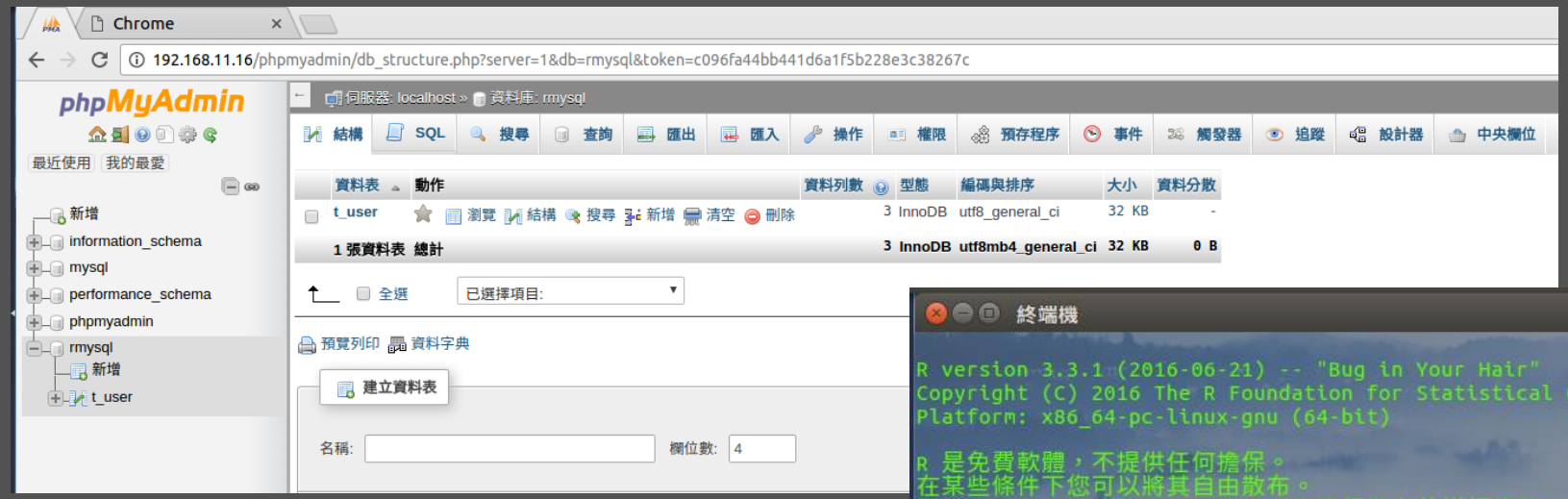


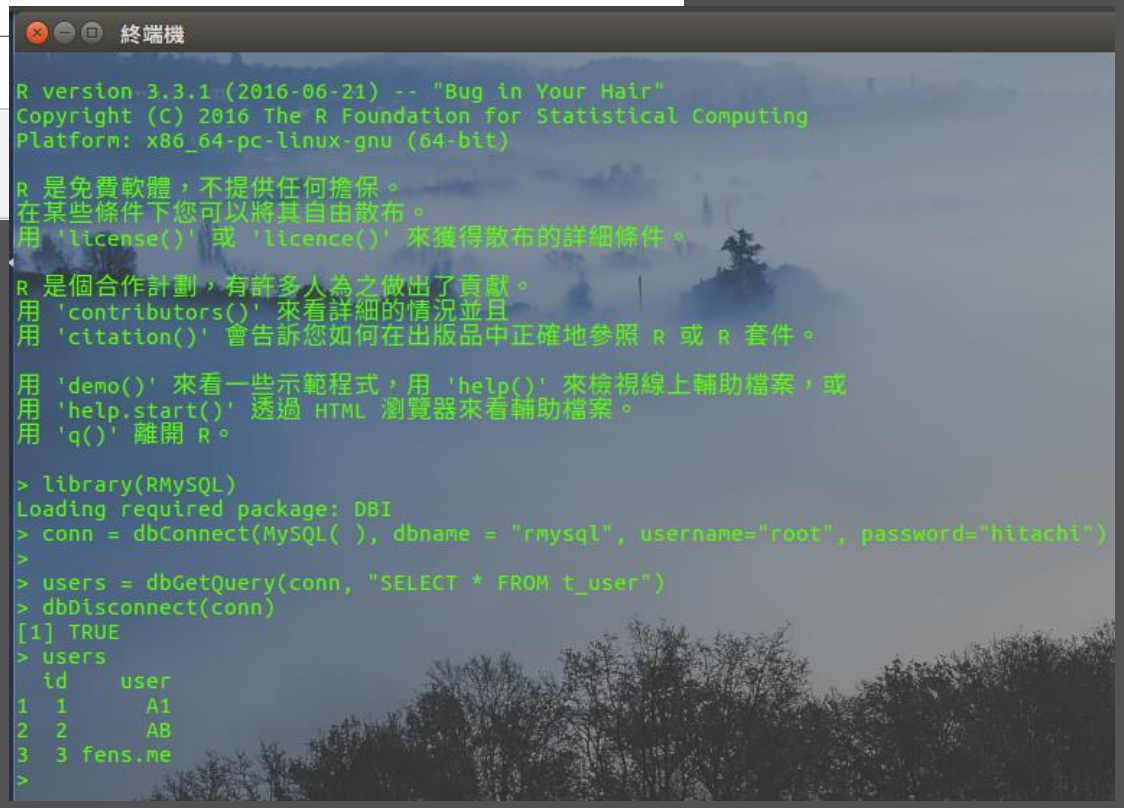




R MariaDB 與 RMYSQL套件設定 by Ubuntu Linux

進到之前裝的 phpmyAdmin 可以看到資料庫已經建立起來了....






```
library("RMySQL")
conn = dbConnect(MySQL(),
                 dbname = "rmysql",
                 username = "root",
                 password = "hitachi")
users = dbGetQuery(conn,
                   "SELECT * FROM t_user")
dbDisconnect(conn)
users
```

R 統計軟體 -R Commander & foreign

1. SPSS
2. SAS
3. STATA
4. EXCEL

```
library(foreign)
# SPSS
spss = read.spss("C:/.../spss_ex.sav",
                 use.value.labels=TRUE,
                 max.value.labels=Inf,
                 to.data.frame=TRUE)
colnames(spss) = tolower(colnames(spss))

# SAS
.Datasets = read.xport("C:/.../sas_ex.xpt")
sas = .Datasets
remove(.Datasets)
```

```
# STATA
stata = read.dta("C:/.../stata_ex.dta",
                 convert.dates=TRUE,
                 convert.factors=TRUE,
                 missing.type=TRUE,
                 convert.underscore=TRUE,
                 warn.missing.labels=TRUE)
# Excel
excel <- readXL("C:/.../excel_ex.xls",
                 rownames=FALSE,
                 header=TRUE, na="",
                 sheet="Tomato_First",
                 stringsAsFactors=TRUE)
```

RData

預設會存在使用者家目錄的文件目錄

save( ) 函數 - 儲存
save(tomato, file = "tomato.rdata") -> save(物件名稱, file = "檔名.rdata")

儲存多個物件
save(n, r, w, file = "multiple.rdata") -> save(物件名稱1,物件名稱2,物件名稱3, file = "檔名.rdata")

rm( ) 函數 - 移除
rm(tomato) -> rm(物件名稱)

head( ) 函數 -檢視
head(tomato) -> head(物件名稱)

load( ) 函數 -載入
load("tomato.rdata") -> load("檔名.rdata")

R 內建資料集

1. ggplot2 套件 的 diamonds 資料 (鑽石)

```
require(ggplot2)
data(diamonds)
head(diamonds)
```

```
> require(ggplot2)
Loading required package: ggplot2
> data(diamonds)
> head(diamonds)
  carat       cut color clarity depth table price    x    y    z
1  0.23     Ideal     E     SI2  61.5    55   326 3.95 3.98 2.43
2  0.21   Premium     E     SI1  59.8    61   326 3.89 3.84 2.31
3  0.23      Good     E     VS1  56.9    65   327 4.05 4.07 2.31
4  0.29   Premium     I     VS2  62.4    58   334 4.20 4.23 2.63
5  0.31      Good     J     SI2  63.3    58   335 4.34 4.35 2.75
6  0.24 Very Good     J    VVS2  62.8    57   336 3.94 3.96 2.48
>
```

2. IRIS 鳶尾花 生物資料集

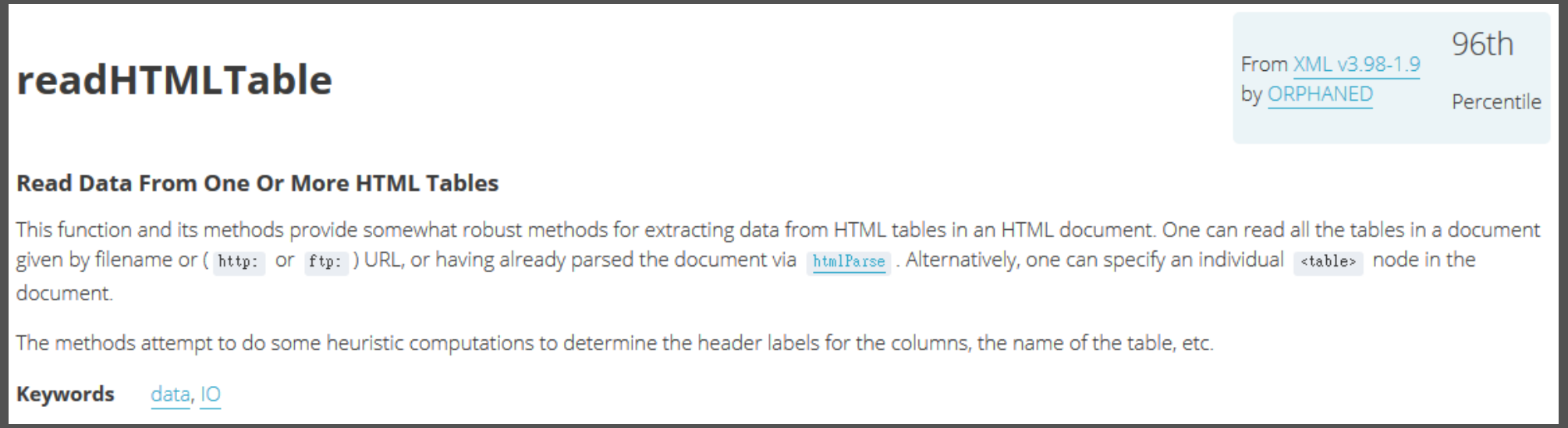
```
data(iris)
head(iris)
```

```
> data(iris)
> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
>
```

R - readHTMLTable


```
require(XML)
theURL = "http://XXXX"
Data = readHTMLTable(theURL, which = 1, header = FALSE, stringsAsFactors = FALSE)
```

which -> 可選要讀取的列表
header -> 表頭的設定
stringsAsFactors -> 防範 factor 和 character 直行上的問題

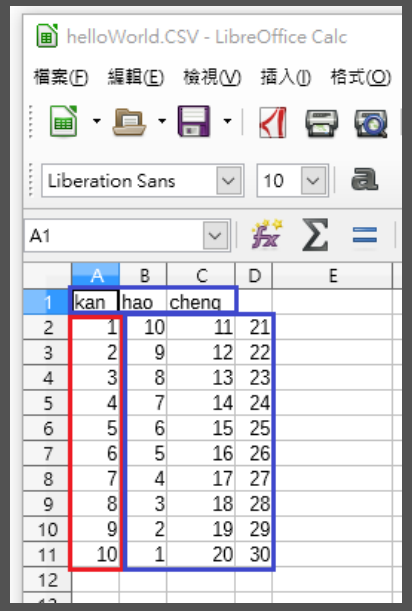


R - 匯入多個 csv 檔案

```
setwd("C:/....")
getwd()
csvpath = "C:/..../"
csvfilesn = list.files( path = csvpath, pattern="*.csv")
tmprt = function(rtcsv){
read.csv( rtcsv, stringsAsFactors = FALSE)
}
data = lapply(paste(csvpath,csvfilesn, sep = ""), tmprt)
csvfilesn
data = data[[1]]
```

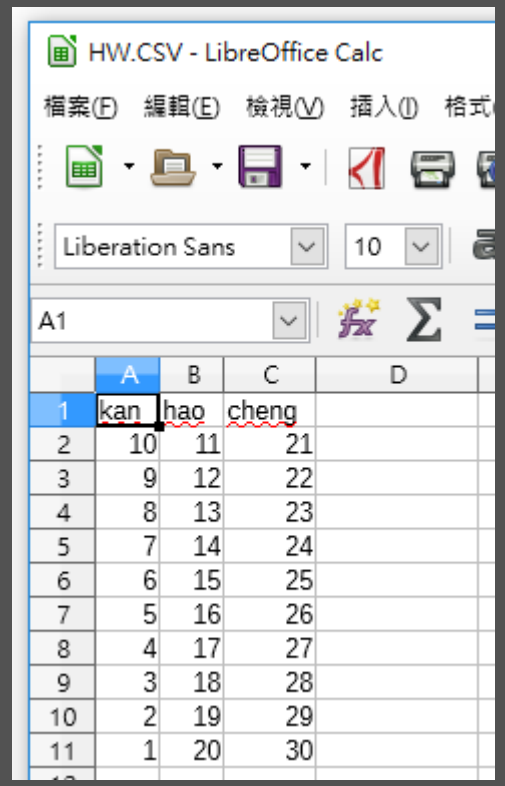
R - 利用自訂函數來匯入多個 csv 檔案

```
a = c(10:1)
b = c(11:20)
c = c(21:30)
test = data.frame( a, b, c)
test
colnames(test) = c("kan", "hao", "cheng")
test
write.table( test, file = "helloWorld.CSV", sep = ",")
getwd()
write.table( test, file= "HW.CSV",
                   quote = FALSE, sep = ",",
                   row.names = FALSE)
```



	A	B	C	D	E
1	kan	hao	cheng		
2	1	10	11	21	
3	2	9	12	22	
4	3	8	13	23	
5	4	7	14	24	
6	5	6	15	25	
7	6	5	16	26	
8	7	4	17	27	
9	8	3	18	28	
10	9	2	19	29	
11	10	1	20	30	
12					

```
> test
   kan hao cheng
1   10  11    21
2    9  12    22
3    8  13    23
4    7  14    24
5    6  15    25
6    5  16    26
7    4  17    27
8    3  18    28
9    2  19    29
10   1  20    30
```



	A	B	C	D
1	kan	hao	cheng	
2	10	11	21	
3	9	12	22	
4	8	13	23	
5	7	14	24	
6	6	15	25	
7	5	16	26	
8	4	17	27	
9	3	18	28	
10	2	19	29	
11	1	20	30	

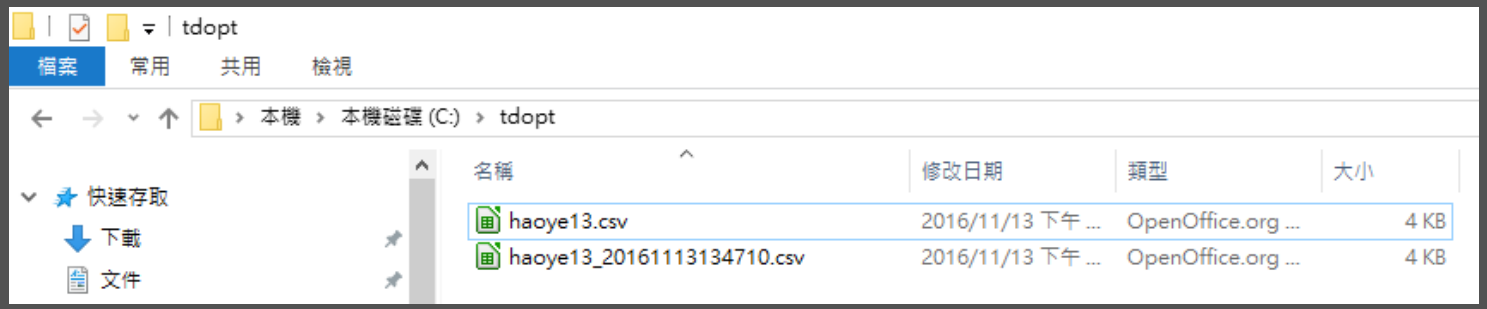
```
> a = c(10:1)
> b = c(11:20)
> c = c(21:30)
> test = data.frame( a, b, c)
> test
    a  b  c
1  10 11 21
2   9 12 22
3   8 13 23
4   7 14 24
5   6 15 25
6   5 16 26
7   4 17 27
8   3 18 28
9   2 19 29
10  1 20 30
> colnames(test) = c("kan", "hao", "cheng")
> test
   kan hao cheng
1   10  11    21
2    9  12    22
3    8  13    23
4    7  14    24
5    6  15    25
6    5  16    26
7    4  17    27
8    3  18    28
9    2  19    29
10   1  20    30
> write.table( test, file = "helloWorld.CSV", sep = ",")
> getwd()
[1] "D:/USERDATA/Documents"
> write.table( test, file= "HW.CSV", quote = FALSE, sep = ",", row.names = FALSE)
>
```

R 多個套件安裝與檢查

```
# set a CRAN mirror
#Automatic redirection to servers worldwide, currently sponsored by
Rstudio
local({r = getOption("repos")
r["CRAN"] = "https://cloud.r-project.org/"
options(repos=r)})

# install package name
pkgs = c("devtools", "xml2", "plyr", "dplyr", "data.table", "text2vec",
"jiebaR", "fmsb", "e1071", "rpart","randomForest", "GGally","lubridate",
"stringr", "ggplot2", "scales", "reshape2", "data.table", "coefplot", "Rcmdr",
"broom", "xlsx", "shiny")

pkgs = pkgs[!( pkgs %in% installed.packages()[,"Package"] )]

#install
if(length(pkgs)) install.packages(pkgs)
```

R 使用自訂函數來處理匯出檔案覆蓋的問題

```
# 1
wrta = function(xdo , ycsv){
write.table( xdo, file= ycsv, quote = FALSE, sep = ",", row.names = FALSE)
}
setwd("C:/[工作目錄路徑]")
getwd()

# 2
wrta = function(xdo , ycsv, swd = getwd()){
setold = getwd()
setwd(swd)
  dirseh = dir()
  if( length(which(ycsv == dirseh)) > 0){
    sdc = as.character(Sys.time())
    sdc1t = gsub( ":", " ", sdc)
    sdc2t = gsub( "-", " ", sdc1t)
    sdc3t = paste(strsplit( sdc2t ,split = " ", fixed = T)[[1]],collapse="")
    s2pt = strsplit( ycsv ,split=".",fixed=T)
    ycsvhd = paste0( s2pt[[1]][1], "_", sdc3t, ".", s2pt[[1]][2])
    write.table( xdo, file= ycsvhd, quote = FALSE, sep = ",", row.names = FALSE)
  }else{
    write.table( xdo, file= ycsv, quote = FALSE, sep = ",", row.names = FALSE)
  }
setwd(setold)
}
```




```
sdop = "C:/[工作目錄路徑] "
head( iris, 3)
getwd()
wrta( iris, "haoye13.csv")
wrta( iris, "haoye13.csv")
wrta( iris, "haoye13.csv", sdop)
wrta( iris, "kan13.csv", sdop)
```

R 資料輸入 - scan

1.what - 可以指定輸入的內容，如 logical、 integer、 numeric、 complex、 character、 raw 與 list。

2. nmax - 為設定輸入資料的最大次數。

3. file - 所要輸入的檔案名稱

scan {base}

Read Data Values

Description

Read data into a vector or list from the console or file.

Usage

```
scan(file = "", what = double(), nmax = -1, n = -1, sep = "",
     quote = if(identical(sep, "\n")) "" else "'\"", dec = ".",
     skip = 0, nlines = 0, na.strings = "NA",
     flush = FALSE, fill = FALSE, strip.white = FALSE,
     quiet = FALSE, blank.lines.skip = TRUE, multi.line = TRUE,
     comment.char = "", allowEscapes = FALSE,
     fileEncoding = "", encoding = "unknown", text, skipNul = FALSE)
```

R 資料輸入 - scan

```
sc1 = scan()
0 9
2 9

sc1

sc2 = scan(nmax = 1)
0 9 2 9

sc2
sc3 = scan(what = "character", quiet = TRUE)
Hi KanCheng

class(sc3)
NROW(sc3)
sc3
```

```
> sc1 = scan()
1: 0 9
3: 2 9
5:
Read 4 items
> sc1
[1] 0 9 2 9
>
> sc2 = scan(nmax = 1)
1: 0 9 2 9
Read 1 item
>
```

```
> sc3 = scan(what = "character", quiet = TRUE)
1: Hi KanCheng
3:
> class(sc3)
[1] "character"
> NROW(sc3)
[1] 2
> sc3
[1] "Hi"        "KanCheng"
>
```

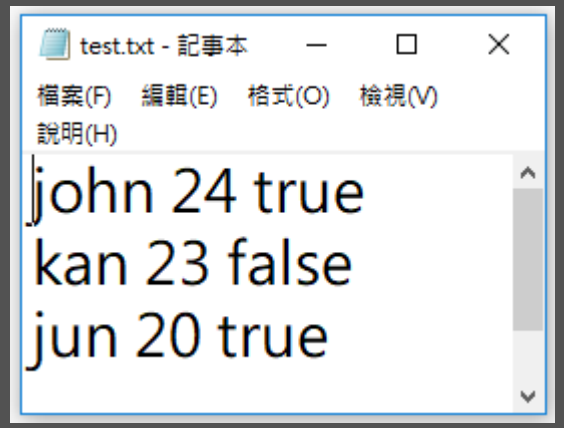
```
sc4 = scan(what = "character", quiet = TRUE)
"Hi KanCheng"

class(sc4)
NROW(sc4)
sc4

sc5 = scan( what = list(name = "character",
   age = "numeric",
   pass = "logical"))
john 24 true
kan 23 false
jun 20 true

class(sc5)
summary(sc5)
sc5
```

```
> sc4 = scan(what = "character", quiet = TRUE)
1: "Hi KanCheng"
2:
> class(sc4)
[1] "character"
> NROW(sc4)
[1] 1
> sc4
[1] "Hi KanCheng"
>
```

```
> sc5 = scan( what = list(name = "character",
+ age = "numeric",
+ pass = "logical"))
1: john 24 true
2: kan 23 false
3: jun 20 true
4:
Read 3 records
> class(sc5)
[1] "list"
> summary(sc5)
     Length Class  Mode
name 3      -none- character
age  3      -none- character
pass 3      -none- character
> sc5
$name
[1] "john" "kan"  "jun"

$age
[1] "24" "23" "20"

$pass
[1] "true"  "false" "true"

>
```

R 資料輸入 - scan

```
getwd()
setwd("C:/rws/scan")
getwd()
dir()

sc.data = scan(file = "test.txt",
   what = list(name = "character",
   age = "numeric",
   pass = "logical"))
sc.data
sc.mat = as.data.frame(sc.data)
class(sc.mat)
sc.mat
```




```
> getwd()
[1] "C:/rws"
> setwd("C:/rws/scan")
> getwd()
[1] "C:/rws/scan"
> dir()
[1] "test.txt"
>
> sc.data = scan(file = "test.txt",
+ what = list(name = "character",
+ age = "numeric",
+ pass = "logical"))
Read 3 records
> sc.data
$name
[1] "john" "kan"  "jun"

$age
[1] "24" "23" "20"

$pass
[1] "true"  "false" "true"

> sc.mat = as.data.frame(sc.data)
> class(sc.mat)
[1] "data.frame"
> sc.mat
  name age  pass
1 john  24  true
2  kan  23 false
3  jun  20  true
>
```

R 匯出執行結果紀錄 - sink

輸出範例資料

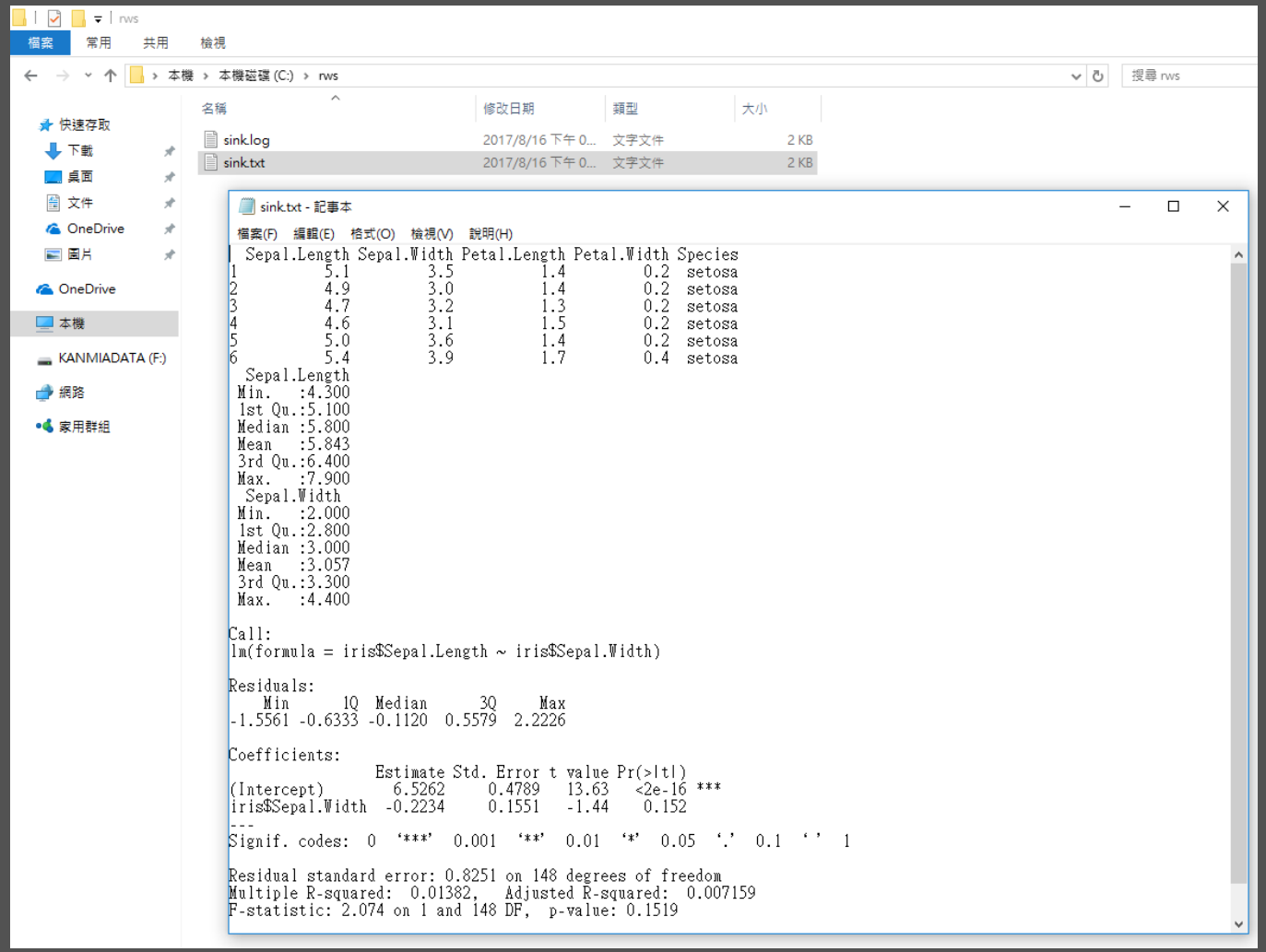
head(iris)
summary(iris[1])
summary(iris[2])
summary(lm(iris$Sepal.Length ~ iris$Sepal.Width))

```
> summary(lm(iris$Sepal.Length ~ iris$Sepal.Width))

Call:
lm(formula = iris$Sepal.Length ~ iris$Sepal.Width)

Residuals:
    Min      1Q  Median      3Q     Max
-1.5561 -0.6333 -0.1120  0.5579  2.2226

Coefficients:
                Estimate Std. Error t value Pr(>|t|)
(Intercept)       6.5262     0.4789   13.63   <2e-16 ***
iris$Sepal.Width -0.2234     0.1551   -1.44    0.152
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8251 on 148 degrees of freedom
Multiple R-squared:  0.01382,   Adjusted R-squared:  0.007159
F-statistic: 2.074 on 1 and 148 DF,  p-value: 0.1519

> |
```

```
> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
> summary(iris[1])
  Sepal.Length
 Min.   :4.300
 1st Qu.:5.100
 Median :5.800
 Mean   :5.843
 3rd Qu.:6.400
 Max.   :7.900
> summary(iris[2])
  Sepal.Width
 Min.   :2.000
 1st Qu.:2.800
 Median :3.000
 Mean   :3.057
 3rd Qu.:3.300
 Max.   :4.400
```

R 匯出執行結果紀錄 - sink

在該函數第一行用 sink() 輸入字串路徑與所要的檔名與副檔名，結束後用 sink() 匯出。



在此有嘗試過 ".log" 和 ".txt" 的版本。

```
sink("c:/rws/sink.log")
head(iris)
summary(iris[1])
summary(iris[2])
summary(lm(iris$Sepal.Length ~ iris$Sepal.Width))
sink()
```

```
sink("c:/rws/sink.txt")
head(iris)
summary(iris[1])
summary(iris[2])
summary(lm(iris$Sepal.Length ~ iris$Sepal.Width))
sink()
```

R 計算執行時間

1. mat 為自己寫的自訂函數，塞一個連續數值向量就會加 1。

2. data 為 1 - 100 的連續數列資料。

可以使用 system.time({ ..... }) 來進行測試。

```
> data = 1:100
> mat = function(obj){
+     out = NULL
+     for( addnb in 1:length(obj)){
+         out[addnb] = obj[addnb] + 1
+     }
+     out
+ }
>
> system.time({
+     mat(data)
+ })
   user  system elapsed
      0       0       0
> |
```

```
data = 1:100
mat = function(obj){
   out = NULL
   for( addnb in 1:length(obj)){
      out[addnb] = obj[addnb] + 1
   }
   out
}

system.time({
mat(data)
})
```

R 記憶體資訊

當中的單位標準為 MB，而使用 32 位元版本最多只會有 4095。

```
> # 當前使用的記憶體
> # current memory in use
> memory.size(max = FALSE)
[1] 182.88
>
> # 從OS獲得的最大記憶體
> # maximum memory obtained from the OS
> memory.size(max = TRUE)
[1] 186.69
>
> # 當前記憶體限制
> # current memory limit
> memory.size(max = NA)
[1] 65499
>
> # 當前記憶體限制
> # current memory limit
> memory.limit(size = NA)
[1] 65499
>
> #增加記憶體限制
> # increase memory limit
> memory.limit(size = size)
Error in memory.limit(size = size) : object 'size' not found
>
```

```
# 當前使用的記憶體
# current memory in use
memory.size(max = FALSE)

# 從OS獲得的最大記憶體
# maximum memory obtained from the OS
memory.size(max = TRUE)

# 當前記憶體限制
# current memory limit
memory.size(max = NA)

# 當前記憶體限制
# current memory limit
memory.limit(size = NA)

#增加記憶體限制
# increase memory limit
memory.limit(size = size)
```

R 記憶體資訊

R 文件

memory.size {utils}

Report on Memory Allocation

Description

`memory.size` reports the current or maximum memory allocation of the `malloc` function used in this version of R.

`memory.limit` reports or increases the limit in force on the total allocation.

Usage

```
memory.size(max = FALSE)

memory.limit(size = NA)
```

Arguments

`max`	logical. If `TRUE` the maximum amount of memory obtained from the OS is reported, if `FALSE` the amount currently in use, if `NA` the memory limit.
`size`	numeric. If `NA` report the memory limit, otherwise request a new limit, in Mb. Only values of up to 4095 are allowed on 32-bit R builds, but see 'Details'.

R 記憶體資訊

R 物件所佔的記憶體資訊

在此建立一個包含了 1 - 1000000 連續資料，並叫出 iris 資料集作為測試。

```
> x = 1:1000000
> NROW(x)
[1] 1000000
> head(x)
[1] 1 2 3 4 5 6
> tail(x)
[1]  999995  999996  999997  999998  999999 1000000
> object.size(x)
4000040 bytes
> head(iris)
  Sepal.Length Sepal.Width Petal.Length Petal.Width Species
1          5.1         3.5          1.4         0.2  setosa
2          4.9         3.0          1.4         0.2  setosa
3          4.7         3.2          1.3         0.2  setosa
4          4.6         3.1          1.5         0.2  setosa
5          5.0         3.6          1.4         0.2  setosa
6          5.4         3.9          1.7         0.4  setosa
> object.size(iris)
7088 bytes
> |
```

x = 1:1000000
NROW(x)
head(x)
tail(x)
object.size(x)
head(iris)
object.size(iris)

R 查詢系統與版本資訊

```
# R 版本資訊
R.Version()

version

# R 系統環境資訊
Sys.getenv("R_ARCH")

Sys.getenv()

# 系統資訊
Sys.info()

# 估算 R 物件所占記憶體大小
x = 1:1000000
object.size(x)

# 系統年月日
Sys.Date()

# 系統地區資訊
Sys.getlocale()

# 系統時區
Sys.timezone()

# 顯示 R 版本、系統與套件等資訊
sessionInfo()

# 系統時間包含日月時分秒
Sys.time()
```

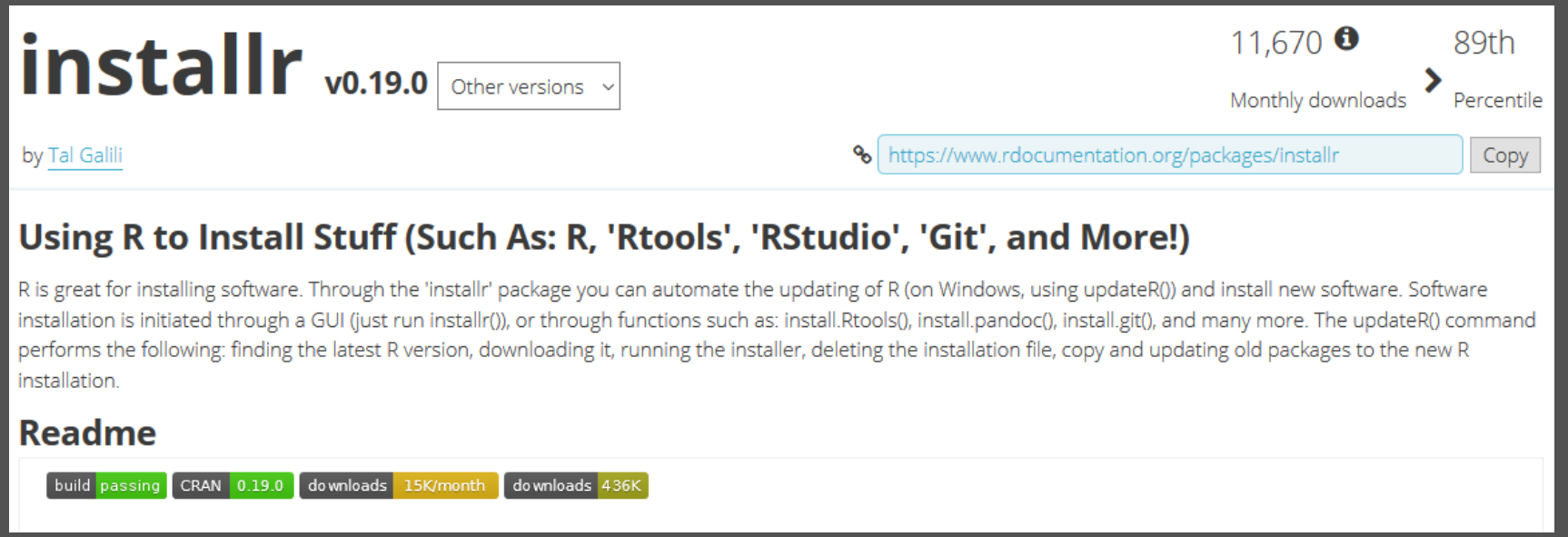
```
> # R 版本資訊
> R.Version()
$platform
[1] "x86_64-w64-mingw32"

$arch
[1] "x86_64"

$os
[1] "mingw32"

$system
[1] "x86_64, mingw32"
```

```
> version
               _
platform       x86_64-w64-mingw32
arch           x86_64
os             mingw32
system         x86_64, mingw32
status
major          3
minor          4.1
year           2017
month          06
day            30
svn rev        72865
language       R
version.string R version 3.4.1 (2017-06-30)
nickname       Single Candle
>
```

```
> # R 系統環境資訊
> Sys.getenv("R_ARCH")
[1] "/x64"
>
> Sys.getenv()
ALLUSERSPROFILE                 C:\ProgramData
APPDATA                         C:\Users\USER\AppData\Roaming
CLASSPATH                       .;C:\Program Files (x86)\QuickTime\QTSystem\QTJava.zip
CommonProgramFiles              C:\Program Files\Common Files
CommonProgramFiles(x86)         C:\Program Files (x86)\Common Files
CommonProgramW6432              C:\Program Files\Common Files
COMPUTERNAME                    HC-B15MCI7
ComSpec                         C:\WINDOWS\system32\cmd.exe
DISPLAY                         :0
FP_NO_HOST_CHECK                NO
FPS_BROWSER_APP_PROFILE_STRING  Internet Explorer
FPS_BROWSER_USER_PROFILE_STRING Default
GFORTRAN_STDERR_UNIT            -1
GFORTRAN_STDOUT_UNIT            -1
GIT_LFS_PATH                    C:\Program Files\Git LFS
```

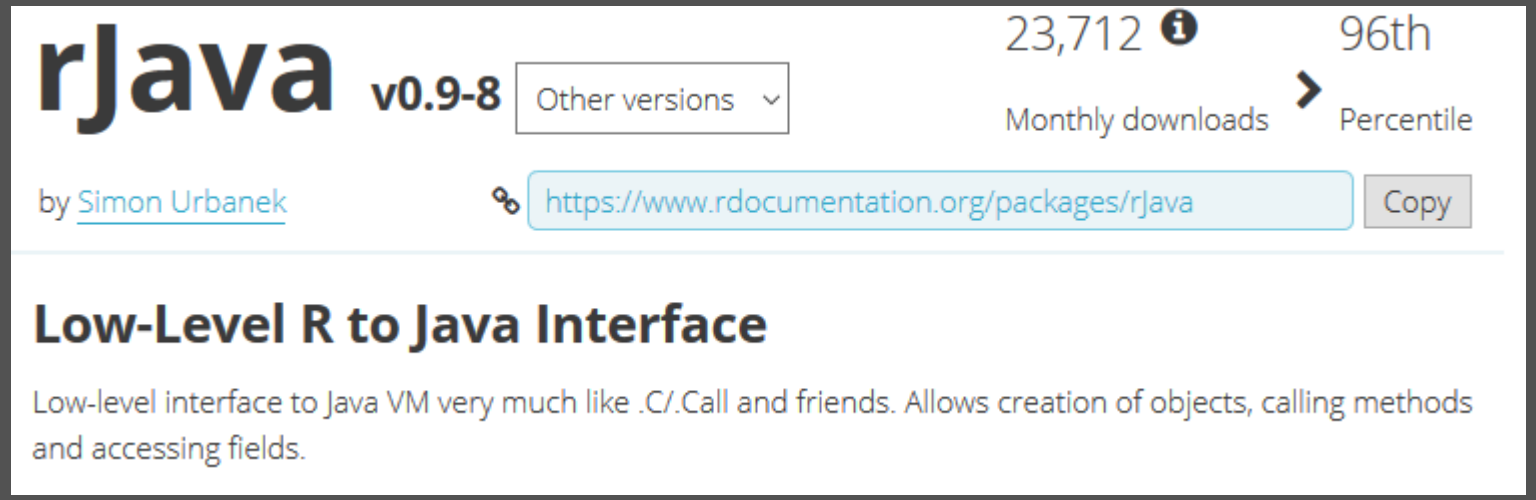
Packages - installr

```
# install.packages("installr")

library("installr")

installr()
```



Packages - rJava

```
# install.packages("rJava")

library("rJava")
```

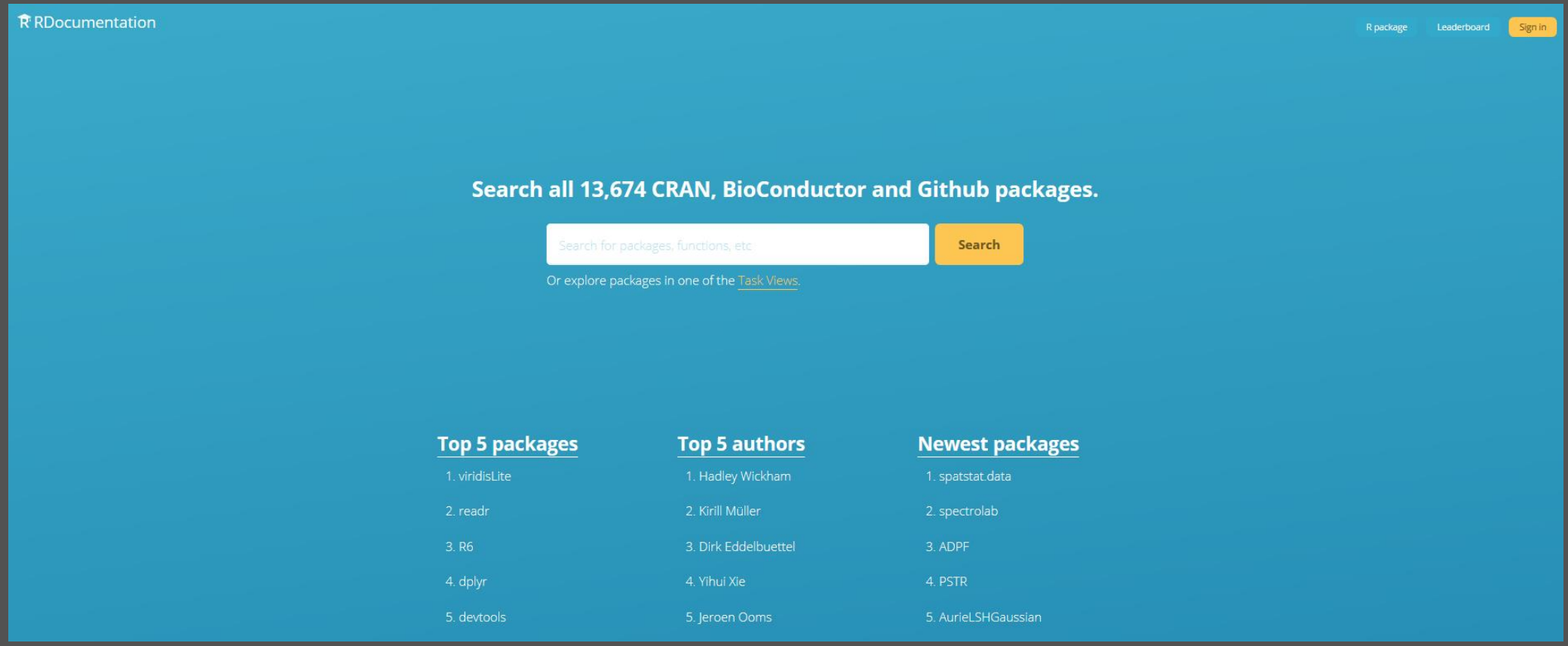


Packages - ROracle

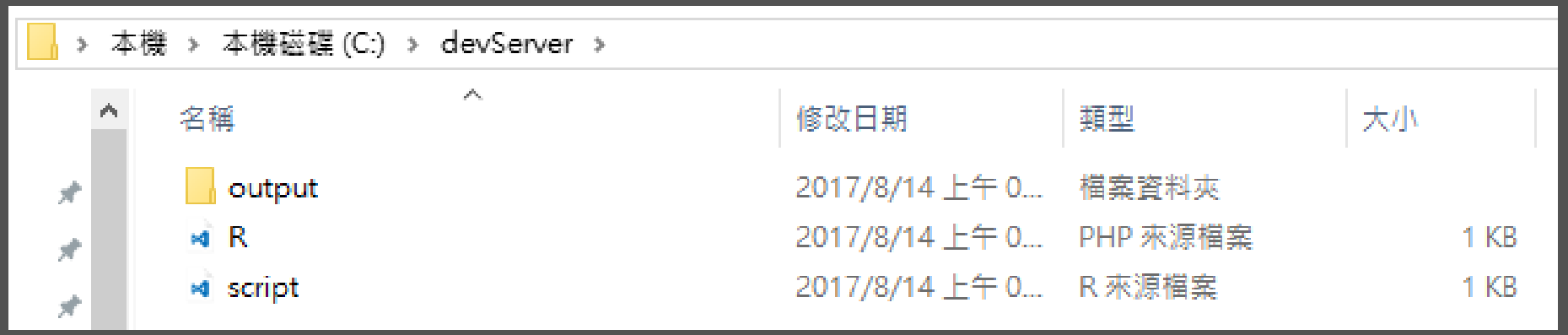
```
# install.packages("ROracle")

library("ROracle ")
```

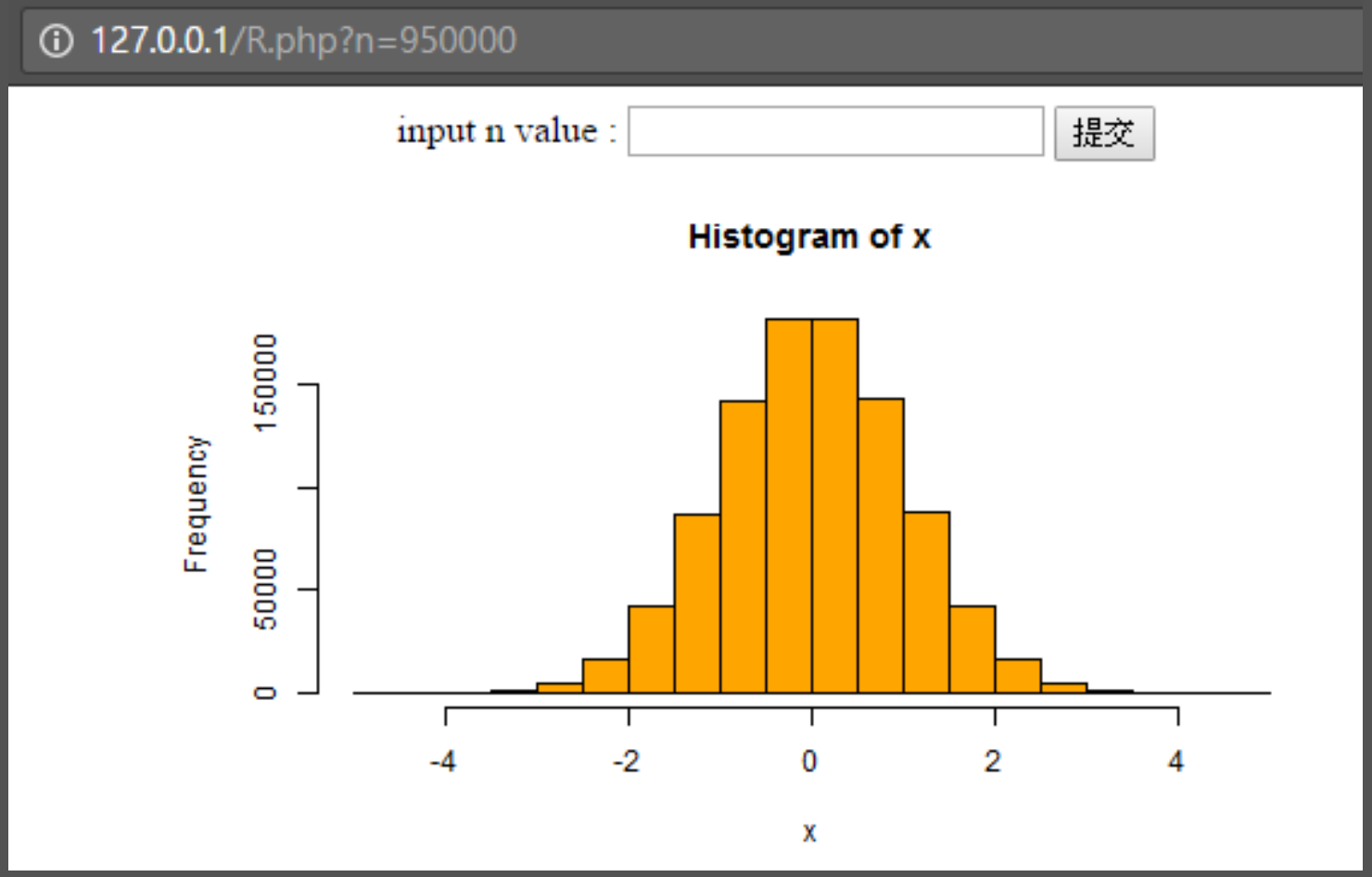
RDocumentation

https://www.rdocumentation.org/



R & PHP

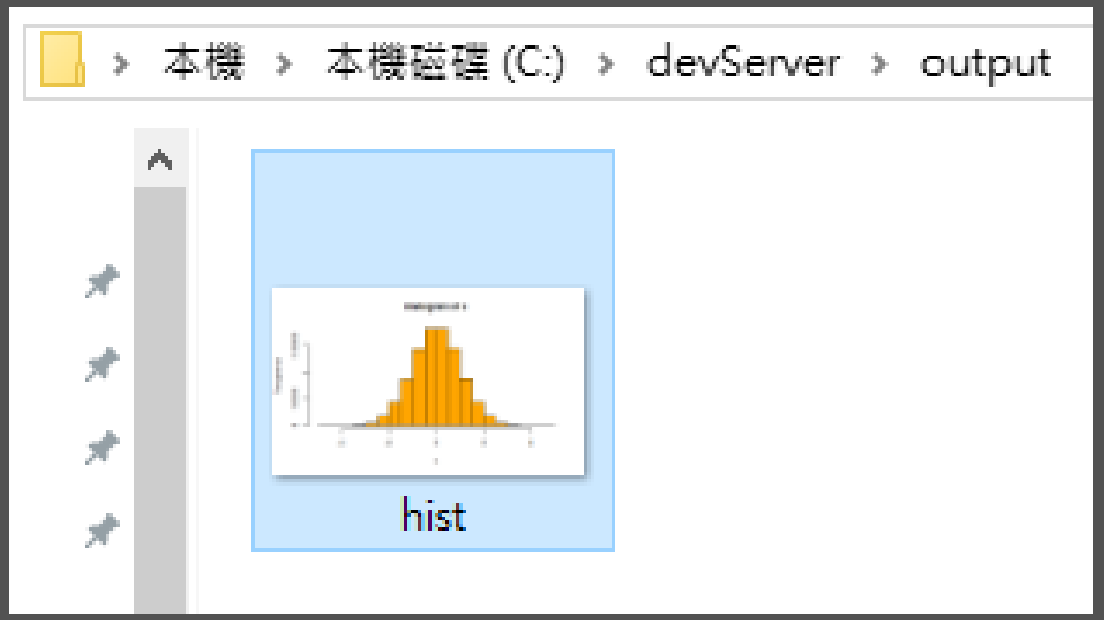




設定好 Apache 與 php 後，在此建立名為 R.php 與 script.R 的兩個檔案與一個名為 output 目錄，用於存放 script.R 輸出的結果。

R & PHP

可以觀察到 PHP 將命令傳給 R 時，會將所輸出的繪圖暫存於 output。

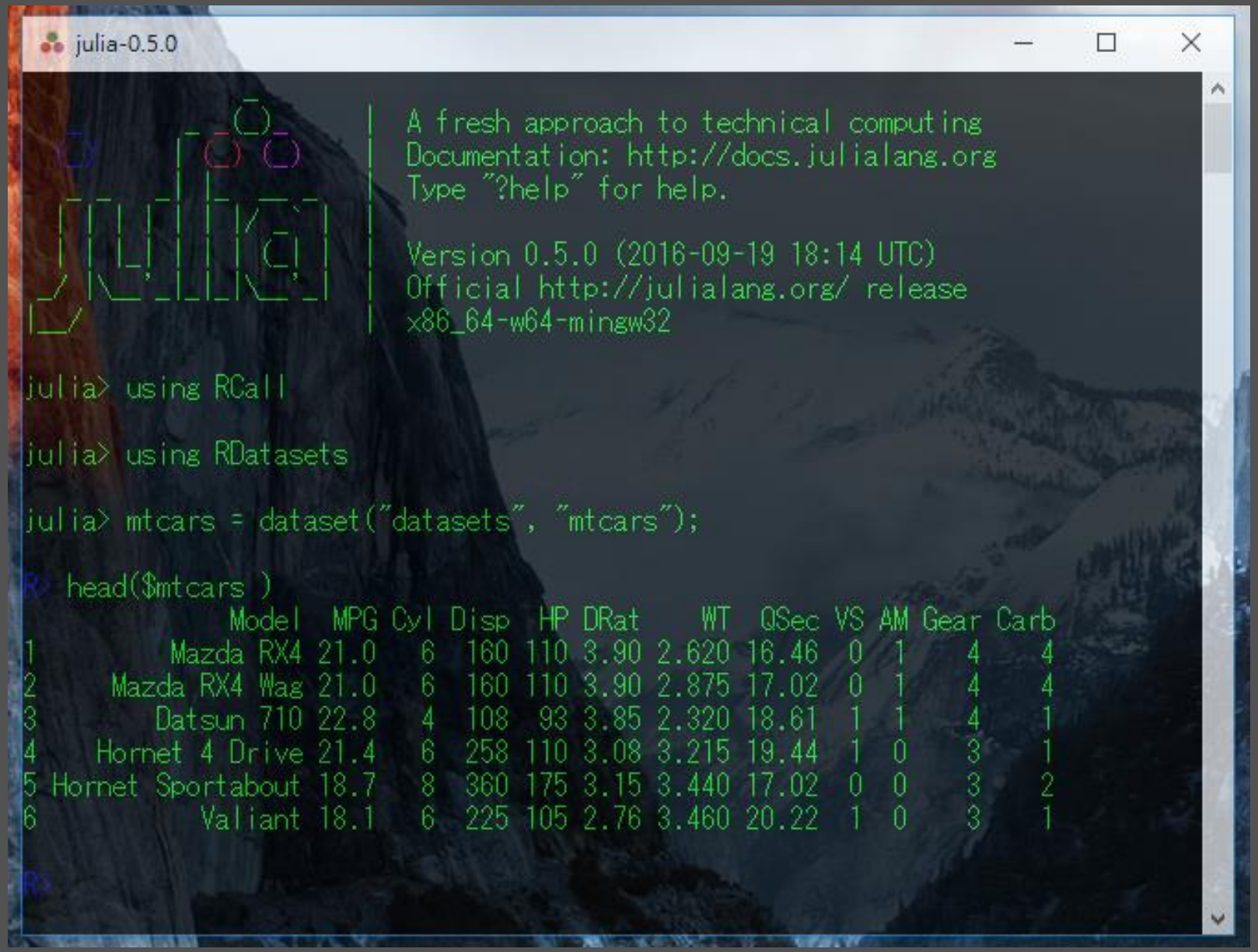


R & Julia

RCall 是連上 R，而 RDatasets 則是連上 R 原本的資料集。
要注意的地方，在 Julia 中使用 R 時，要按 [$] 鍵 切換至 R 的模式。

而要回到原本的樣子則是直接用 [Backspace] 鍵 即可。
至於在 R 的模式當中要用 Julia 的物件則是要在名稱前面加上 "$" 。

R & Julia


julia-0.5.0
A fresh approach to technical computing
Documentation: http://docs.julialang.org
Type "?help" for help.
Version 0.5.0 (2016-09-19 18:14 UTC)
Official http://julialang.org/ release
x86_64-w64-mingw32
julia> using RCall
julia> using RDatasets
julia> mtcars = dataset("datasets", "mtcars");
R> head($mtcars)
Model MPG Cyl Disp HP DRat WT QSec VS AM Gear Carb
1 Mazda RX4 21.0 6 160 110 3.90 2.620 16.46 0 1 4 4
2 Mazda RX4 Wag 21.0 6 160 110 3.90 2.875 17.02 0 1 4 4
3 Datsun 710 22.8 4 108 93 3.85 2.320 18.61 1 1 4 1
4 Hornet 4 Drive 21.4 6 258 110 3.08 3.215 19.44 1 0 3 1
5 Hornet Sportabout 18.7 8 360 175 3.15 3.440 17.02 0 0 3 2
6 Valiant 18.1 6 225 105 2.76 3.460 20.22 1 0 3 1
R>