

# Building an R package

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- Prepare your functions, example data sets
- Build package structure using **package.skeleton()**
- Edit **DESCRIPTION** file
- Edit **NAMESPACE** file
- Edit the help file (\*.Rd files in man subdirectory)
- Write a package vignette
- Build and install the R package (R CMD build)
- Check the R package (R CMD check)

# Structure of an R package

The `package.skeleton` function produces the following:

- A file named **DESCRIPTION**
- A file named **NAMESPACE**
- A file named **Read-and-delete-me** that tells you what to do next
- A `man/` subdirectory of documentation files
- An `R/` subdirectory of R code
- A `data/` subdirectory of datasets
- `inst/` contains miscellaneous other stuff and package Vignette
























Folders	Developer
 tmp	 zzz.R
 pkgFiles2	 myfunction.R
 misc	Documents
PDF Documents	 mydata.txt
 BRpackage.pdf	
Developer	
 BRpackage.R	
Documents	
 BRpackage.tex	
 BRpackage.Rnw	
 BRpackage.aux	
 BRpackage.log	
 BRpackage.nav	
 BRpackage.snm	
 BRpackage.synctex.gz	
 BRpackage.toc	
 BRpackage.out	
 Sweave.sty	

Copy the directory `pkgFiles2` to a local directory and try the following to create a skeleton R package:

```
> tmpdir <- "tmp"
> if(file.exists(tmpdir)) unlink(tmpdir, recursive=TRUE)
> dir.create(tmpdir)
> source("./pkgFiles2/myfunction.R")
> mydata<-read.delim("./pkgFiles2/mydata.txt", header=T)
> namespace<-c("linmodEst", "mydata")
> package.skeleton(name="mypkg", namespace,path=tmpdir, force=TRUE)
> Stangle("BRpackage.Rnw")
```

Writing to file `BRpackage.R`

# R package example

Folders	Folders	Folders
 tmp	 mypkg	 data
 misc		 man
 pkgFiles2		 R
Images		Documents
 pkgfiles.jpg		 DESCRIPTION
PDF Documents		 NAMESPACE
 BRpackage.pdf		 Read-and-delete-me
Developer		
 BRpackage.R		
Documents		
 BRpackage.Rnw		
 BRpackage.tex		
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Literate programming means that text, data, and computer code are interwoven in a single self-contained document.



Vignettes are written in the spirit of sharing knowledge, and assisting new users in learning the purpose and use of a package.

- A Sweave style vignette (.Rnw) file that contains chunks of code that are evaluated by R at 'R CMD build' time or on demand by the user with the Sweave command.
- The vignette should demonstrate how to use the package to accomplish a non-trivial task (describe a typical workflow).
- The key property of a vignette is “reproducibility”

See also the writing R extensions manual.

# Literate programming for R uses Sweave

Essentially requires a single source document – a '.Rnw' file.

$*.Rnw \xrightarrow{\text{Sweave}} *.tex \xrightarrow{\text{latex}} *.dvi \xrightarrow{\text{xdvi}} \text{view of document}$

see [http://www.bias-project.org.uk/Rpackages\\_course/intro\\_Sweave.pdf](http://www.bias-project.org.uk/Rpackages_course/intro_Sweave.pdf)

# Syntax using Sweave

```
\documentclass{article}  
\usepackage{Sweave}  
\begin{document}  
Some content
```

```
<<      >>=  
my R code chunk  
data<-read.delim("mydata.txt")  
n<-nrow(data)  
@
```

There are  $\backslash Sexpr\{n\}$  observations.

```
\end{document}
```

# Code chunk options

- `eval(TRUE, or FALSE)`  
Whether the R chunk is run
- `echo(TRUE, FALSE)`  
Whether the R chunk is shown in the  $\text{\LaTeX}$  file
- `results(verbatim, hide, tex)`  
Type of output used to show the printed results produced by the R code.
- `fig(TRUE, FALSE)`  
Whether the output is a figure. By default, PDF files are produced.
- `<<figname, fig=TRUE, include=FALSE>>`

The file `LiquidAssociation.Rnw` outlines a possible vignette for an R package.

```
> require(tools)
> library(tools)
> Sys.setenv(PATH = paste(Sys.getenv("PATH"), "/usr/texbin", sep = ":"))
> cpwd<-getwd()
> setwd("./misc")
> Sweave("LiquidAssociation.Rnw")
> texi2dvi("LiquidAssociation.tex", pdf=TRUE)
> setwd(cpwd)
```

# Complete the package

```
> cpd<-getwd()
> tmpdir<-paste(cpd, "/tmp", sep="")
> if(file.exists(file.path(tmpdir, "mypkg/inst"))) {
+   unlink(file.path(tmpdir, "mypkg/inst"))
+ }
> dir.create(file.path(tmpdir, "mypkg/inst/doc"), recursive=TRUE)
> file.copy("../misc/LiquidAssociation.Rnw", file.path(tmpdir, "mypkg/inst/doc/"))

[1] TRUE

> file.copy("../misc/LiquidAssociation.pdf", file.path(tmpdir, "mypkg/inst/doc/"))

[1] TRUE
```

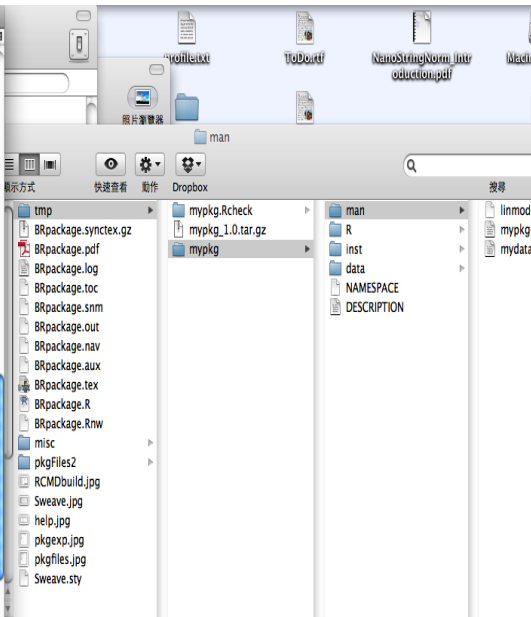
# Vignettes in R packages

- Assume users have not read the paper about your wonderful method yet
- By following the vignette, users learn exactly how to format their own data in order to use the software
- The vignette is automatically checked during R CMD check `<pkgname>`. A working vignette is useful for ensuring that the package is functional as the package evolves

# Running R CMD check

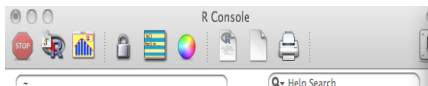
```
终端機 — bash — 66x49
whasdata.txt
x.txt
公費
未命名.rtf
傳送註冊資訊
x-134-84-2-250:~ hoyen-yi$ cd Desktop
x-134-84-2-250:Desktop hoyen-yi$ cd Rpackage/tmp
x-134-84-2-250:tmp hoyen-yi$ ls
mypkg
mypkg mypkg.Rcheck mypkg_1.0.tar.gz
x-134-84-2-250:tmp hoyen-yi$ R CMD build mypkg
* checking for file 'mypkg/DESCRIPTION' ... OK
* preparing 'mypkg':
* checking DESCRIPTION meta-information ... OK
* installing the package to build vignettes
* creating vignettes ... OK
* checking for LF line-endings in source and make files
* checking for empty or unneeded directories
* looking to see if a 'data/datalist' file should be added
* building 'mypkg_1.0.tar.gz'

x-134-84-2-250:tmp hoyen-yi$ R CMD check mypkg_1.0.tar.gz
* using log directory '/Users/hoyen-yi/Desktop/Rpackage/tmp/mypkg.Rcheck'
* using R version 3.0.2 (2013-09-25)
* using platform: x86_64-apple-darwin10.8.0 (64-bit)
* using session charset: UTF-8
* checking for file 'mypkg/DESCRIPTION' ... OK
* checking extension type ... Package
* this is package 'mypkg' version '1.0'
* checking package namespace information ... OK
* checking package dependencies ... OK
* checking if this is a source package ... OK
* checking if there is a namespace ... OK
* checking for executable files ... OK
* checking for hidden files and directories ... OK
* checking for portable file names ... OK
* checking for sufficient/correct file permissions ... OK
* checking whether package 'mypkg' can be installed ... OK
* checking installed package size ... OK
```





# Installing the R package



Platform: x86\_64-apple-darwin10.8.0 (64-bit)

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

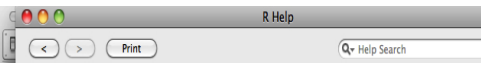
R 是個合作計劃，有許多人為之做出了貢獻。  
用 'contributors()' 來看詳細的情況並且  
用 'citation()' 會告訴您如何在出版品中正確地參照 R 或 R 套件。

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

[R.app GUI 1.62 (6558) x86\_64-apple-darwin10.8.0]

[History restored from /Users/hoyen-yi/.Rhistory]

```
> tmpdir<="/Users/hoyen-yi/Desktop/Rpackage/tmp"
> install.packages(file.path(tmpdir, "mypkg_1.0.tar.gz"),
repos=NULL, type="source", lib=.libPaths()[1])
* installing *source* package 'mypkg' ...
** R
** data
```



mypkg-package {mypkg}

R Docum

This is an example package

## Description

This is an example package

## Details

Package: mypkg

Type: Package

Version: 1.0

Date: 2014-10-21

License: GPL (>= 2)

contains linmodEst function

## Author(s)

John Doe

Maintainer: John Doe <JohnDoe@somewhere.net>

## References

1. John Doe This is my paper

See also

```
> toLatex(sessionInfo())
```

- R version 3.0.2 (2013-09-25), x86\_64-apple-darwin10.8.0
- Locale: zh\_TW.UTF-8/zh\_TW.UTF-8/zh\_TW.UTF-8/C/zh\_TW.UTF-8/zh\_TW.UTF-8
- Base packages: base, datasets, graphics, grDevices, methods, stats, tools, utils