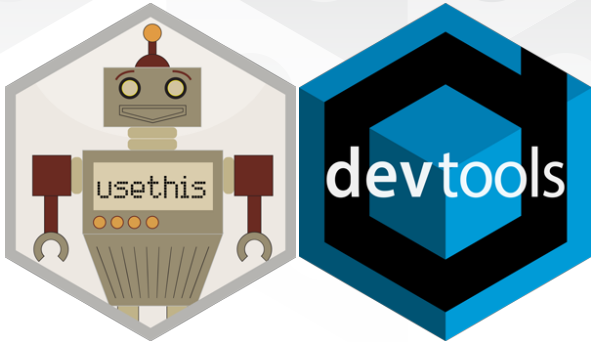
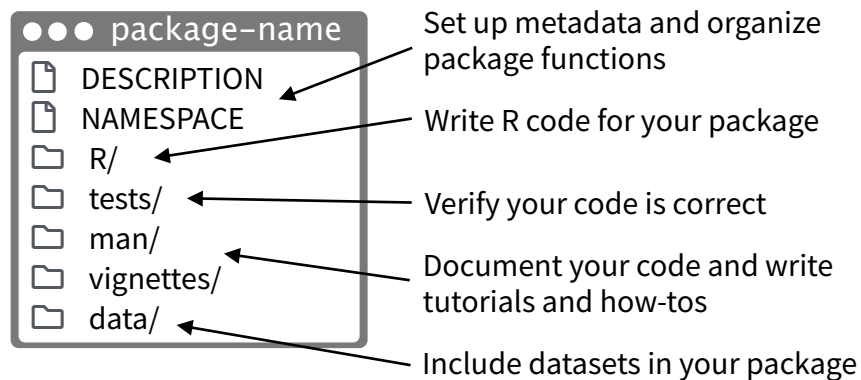


Package Development :: CHEATSHEET



Package Structure

A package is a convention for organizing files into directories. This cheat sheet shows how to work with the 7 most common parts of an R package:



There are multiple packages useful to package development, including **usethis** which handily automates many of the more repetitive tasks. Install and load **devtools**, which wraps together several of these packages to access everything in one step.

Getting Started

Once per machine:

- Get set up with **use_devtools()** so **devtools** is always loaded in interactive R sessions

```
if (interactive()) {
  require("devtools", quietly = TRUE)
  # automatically attaches usethis
}
```

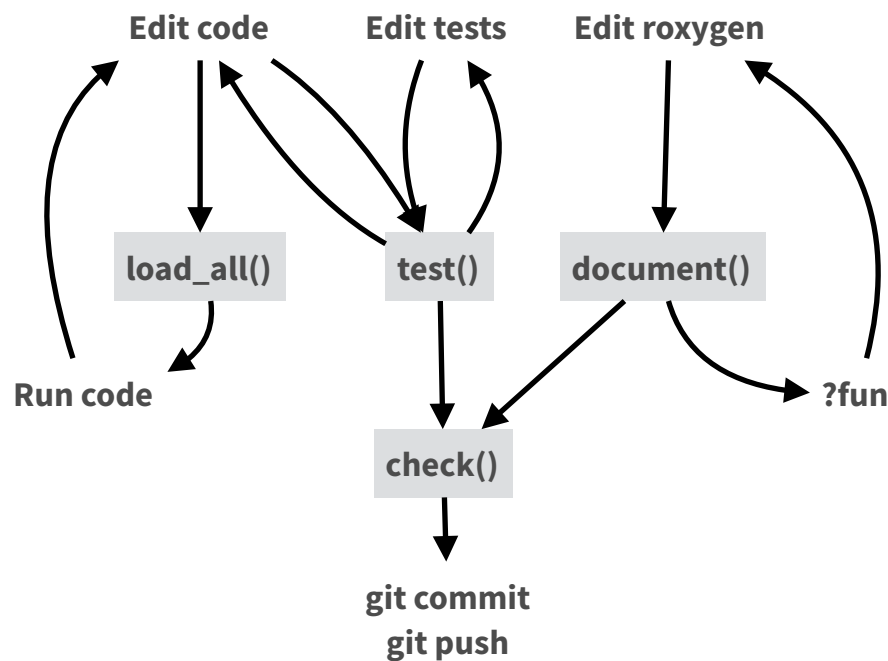
- **create_github_token()** — Set up GitHub credentials
- **git_vaccinate()** — Ignores common special files

Once per package:

- **create_package()** — Create a project with package scaffolding
- **use_git()** — Activate git
- **use_github()** — Connect to GitHub
- **use_github_action()** — Set up automated package checks

Having problems with git? Get a situation report with **git_sitrep()**.

Workflow



- **load_all()** (Ctrl/Cmd + Shift + L) — Load code
- **document()** (Ctrl/Cmd + Shift + D) — Rebuild docs and NAMESPACE
- **test()** (Ctrl/Cmd + Shift + T) — Run tests
- **check()** (Ctrl/Cmd + Shift + E) — Check complete package



All of the R code in your package goes in **R/**. A package with just an **R/** directory is still a very useful package.

- ✓ Create a new package project with **create_package("path/to/name")**.
- ✓ Create R files with **use_r("file-name")**.

- Follow the tidyverse style guide at **style.tidyverse.org**
- Click on a function and press **F2** to go to its definition
- Find a function or file with **Ctrl + .**

DESCRIPTION

The **DESCRIPTION** file describes your work, sets up how your package will work with other packages, and applies a license.

- ✓ Pick a license with **use_mit_license()**, **use_gpl3_license()**, **use_proprietary_license()**.
- ✓ Add packages that you need with **use_package()**.

Import packages that your package requires to work. R will install them when it installs your package.

use_package(x, type = "imports")

Suggest packages that developers of your package need. Users can install or not, as they like.

use_package(x, type = "suggests")

NAMESPACE

The **NAMESPACE** file helps you make your package self-contained: it won't interfere with other packages, and other packages won't interfere with it.

- ✓ Export functions for users by placing **@export** in their roxygen comments.
- ✓ Use objects from other packages with **package::object** or **@importFrom package object** (recommended) or **@import package** (use with caution).
- ✓ Call **document()** to generate **NAMESPACE** and **load_all()** to reload.

DESCRIPTION

Makes **packages** available
Mandatory
use_package()

NAMESPACE

Makes **function** available
Optional (can use **::** instead)
use_import_from()

man/

The documentation will become the help pages in your package.

- Document each function with a roxygen block above its definition in R/. In RStudio, Code > Insert Roxygen Skeleton helps (Ctrl/Cmd + Alt + Shift + R).
- Document each dataset with roxygen block above the name of the dataset in quotes.
- Document the package with `use_package_doc()`.
- Build documentation in `man/` from Roxygen blocks with `document()`.

vignettes/

- Create a vignette that is included with your package with `use_vignette()`.
- Create an article that only appears on the website with `use_article()`.
- Write the body of your vignettes in R Markdown.

Websites with pkgdown



- Use GitHub and `use_pkgdown_github_pages()` to set up pkgdown and configures an automated workflow using GitHub Actions and Pages.
- If you're not using GitHub, call `use_pkgdown()` to configure pkgdown. Then build locally with `pkgdown::build_site()`.

tests/



- Set up test infrastructure with `use_testthat()`.
- Create a test file with `use_test()`.
- Write tests with `test_that()` and `expect_()`.
- Run all tests with `test()` and run tests for current file with `test_active_file()`.
- See coverage of all files with `test_coverage()` and see coverage of current file with `test_coverage_active_file()`.

ROXYGEN2



- The **roxygen2** package lets you write documentation inline in your .R files with shorthand syntax.
- Add roxygen documentation as comments beginning with `#'`.
 - Place a roxygen `@` tag (right) after `#'` to supply a specific section of documentation.
 - Untagged paragraphs will be used to generate a title, description, and details section (in that order).

```
#' Add together two numbers
#
#' @param x A number.
#' @param y A number.
#' @returns The sum of `x` and `y`.
#' @export
#' @examples
#' add(1, 1)
add <- function(x, y) {
  x + y
}
```

COMMON ROXYGEN TAGS

@description	@family	@returns
@examples	@inheritParams	@seealso
@examplesIf	@param	
@export	@rdname	

README.Rmd + NEWS.md

- Create a README and NEWS markdown files with `use_readme_rmd()` and `use_news_md()`.

Expect statement	Tests
<code>expect_equal()</code>	Is equal? (within numerical tolerance)
<code>expect_error()</code>	Throws specified error?
<code>expect_snapshot()</code>	Output is unchanged?

```
test_that("Math works", {
  expect_equal(1 + 1, 2)
  expect_equal(1 + 2, 3)
  expect_equal(1 + 3, 4)
})
```

data/

- Record how a data set was prepared as an R script and save that script to `data-raw/` with `use_data_raw()`.
- Save a prepared data object to `data/` with `use_data()`.

Package States

- The contents of a package can be stored on disk as a:
- source** - a directory with sub-directories (as shown in Package structure)
 - bundle** - a single compressed file (.tar.gz)
 - binary** - a single compressed file optimized for a specific OS
- Packages exist in those states locally or remotely, e.g. on CRAN or on GitHub.
- From those states, a package can be installed into an R library and then loaded into memory for use during an R session.
- Use the functions below to move between these states.

	Repository	Source	Bundle	Binary	Installed	In memory
	Internet	On disk			Library	Memory
<code>library()</code>					●	●
<code>install.packages()</code>	CRAN	→	→	→	●	●
<code>install.packages(type = "source")</code>	CRAN	→	→	→	●	●
<code>install_github()</code>	GitHub	→	→	→	●	●
<code>install()</code>		→	→	→	●	●
<code>build()</code>		→	→	→	●	●
<code>build(binary = TRUE)</code>		→	→	→	●	●
<code>load_all()</code>		→	→	→	→	●



Visit **r-pkgs.org** to learn much more about writing and publishing packages for R.