# R package development

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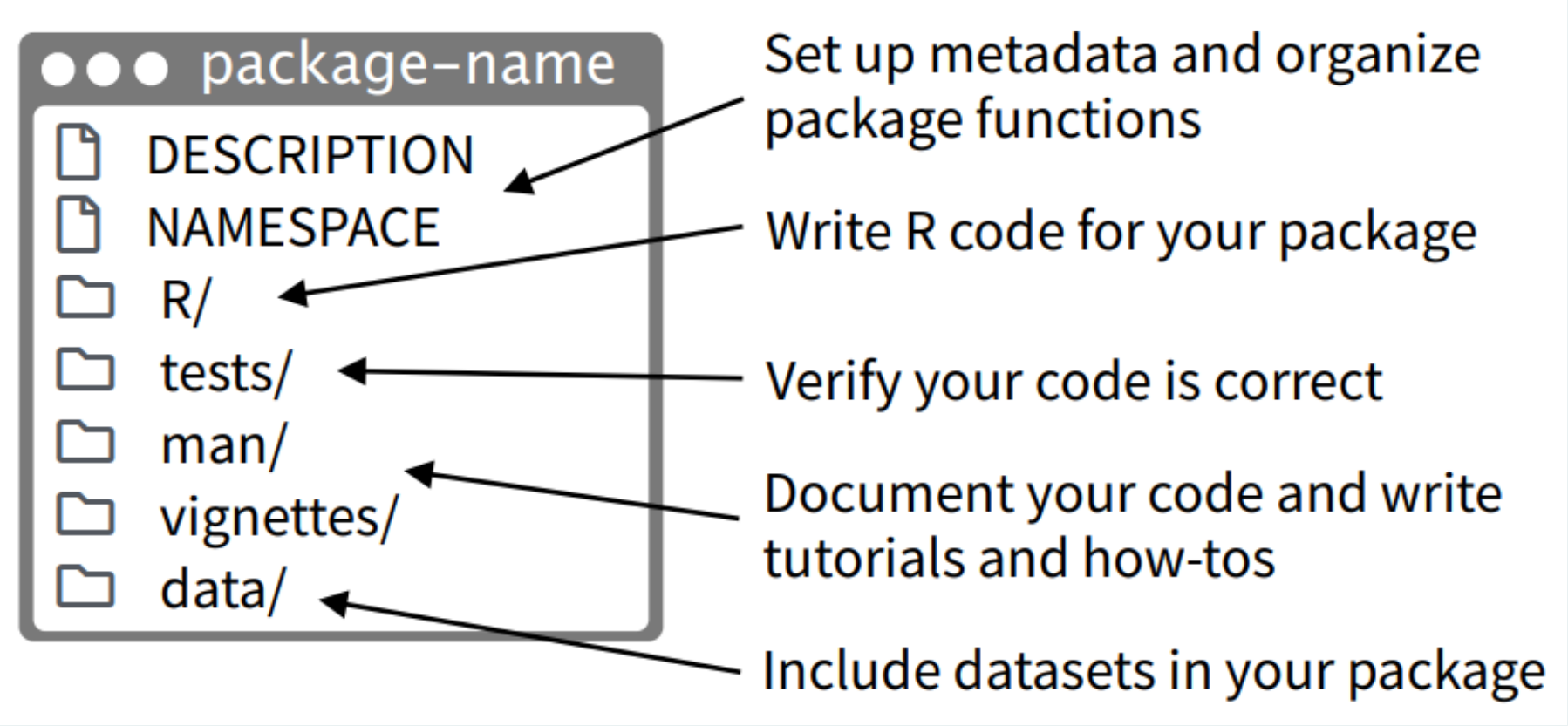
# What is R?

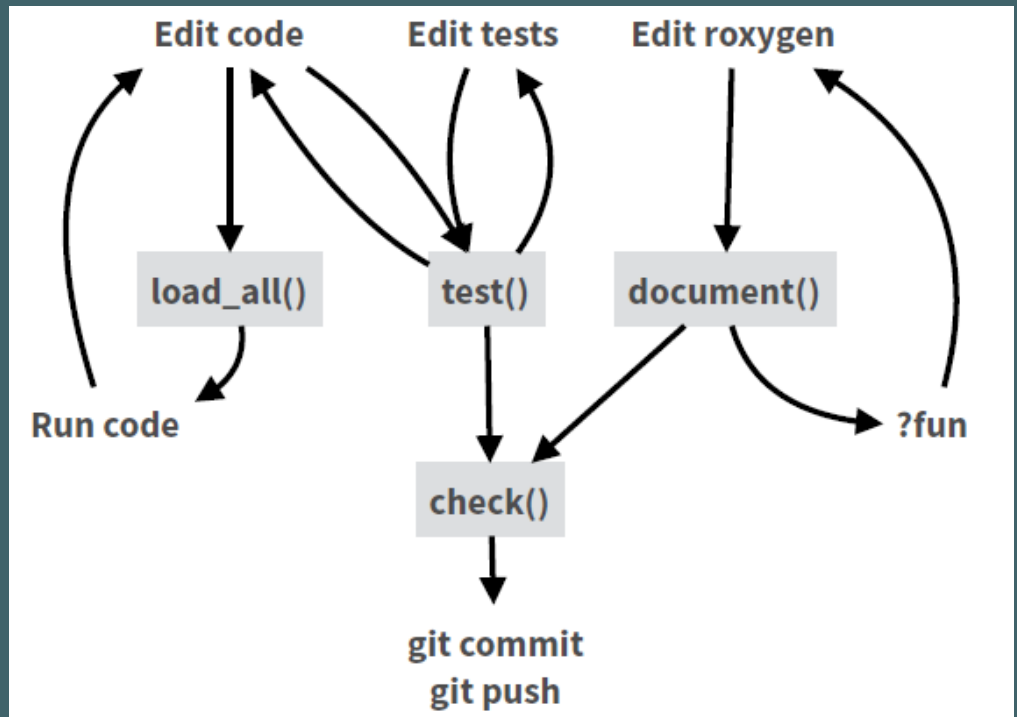
R is a language and environment for statistical computing and graphics

An R package is a directory of files which extend R, a source package, or a tarball containing the files of a source package, or an installed package, the result of running R CMD INSTALL on a source package.

The sources of an R package consist of a subdirectory containing the files DESCRIPTION and NAMESPACE, and the subdirectories R, data, demo, exec, inst, man, po, src, tests, tools and vignettes (some of which can be missing, but which should not be empty).




# 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

# R subdirectory

The R subdirectory contains R code files, only. These files must contain the package functions in R code. Therefore, it is essential to know how to create functions in R:

```
function_name <- function(parameters){
   function body
}
```

# Other...

- Example data
- Save outputs
- Import external functions
- Create auxiliary internal functions
- Include other programming languages

# NAMESPACE

R has a namespace management system for code in packages. This system allows the package writer to specify which variables in the package should be *exported* to make them available to package users, and which variables should be *imported* from other packages.

# DESCRIPTION

```
Package: pkgname
Version: 0.5-1
Date: 2015-01-01
Title: My First Collection of Functions
Authors@R: c(person("Joe", "Developer", role = c("aut", "cre"),
                    email = "Joe.Developer@some.domain.net"),
             person("Pat", "Developer", role = "aut"),
             person("A.", "User", role = "ctb",
                    email = "A.User@whereever.net"))
Author: Joe Developer [aut, cre],
  Pat Developer [aut],
  A. User [ctb]
Maintainer: Joe Developer <Joe.Developer@some.domain.net>
Depends: R (>= 3.1.0), nlme
Suggests: MASS
Description: A (one paragraph) description of what
  the package does and why it may be useful.
License: GPL (>= 2)
URL: https://www.r-project.org, http://www.another.url
BugReports: https://pkgname.bugtracker.url
```

The DESCRIPTION file contains basic information about the package

The “Package”, “Version”, “License”, “Description”, “Title”, “Author” and “Maintainer” fields are mandatory, all other fields are optional.

# Operations on source packages

- **Installation** from source package → R CMD INSTALL or install.packages()
- Source packages con be **built** → taking a source directory and creating a tarball ready for distribution
- *Compilation* is not a correct term for a package. Installing a source package which contains C, C++ or Fortran code will involve compiling that code.
- *Loading* the package's namespace and then *attaching* the package so it becomes visible on the search path → library()

# Thanks

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