

# Lecture 14: Creating an R Package

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DATA WRANGLING AND HUSBANDRY

# Introduction to R Packages

# What is an R Package?

- A structured collection of R functions, data, and documentation.
- Organized with files like DESCRIPTION, R/, man/, data/.
- Allows easy sharing, installation, and reuse of code.

# How to Create an R Package

- Set up folder structure manually or with `usethis::create_package()`.
- Write and organize functions under `R/`.
- Add metadata in the `DESCRIPTION` file.
- Document functions using `roxygen2` or `.Rd` files.
- Test, build, and install using tools like `devtools`.

# Advantages

- Promotes code reuse and standardization.
- Improves collaboration and reproducibility.
- Enhances visibility of research and tools.
- Facilitates maintenance and scaling of codebases.

# Disadvantages

- Requires time and effort to learn best practices.
- Maintenance over time is necessary.
- CRAN submission can be demanding.
- Poor maintenance can lead to user errors and reputational risks.

# First Steps in Package Development

# Setting Up the Package Structure

```
# Load necessary packages
library(usethis)
library(devtools)
# Create a new package
create_package("myPackage")
# Create a new package with a specific path
create_package("path/to/myPackage")
# Create a new package with a specific path and description
create_package("path/to/myPackage", description =
list>Title = "My Package",
  Description = "A package for demonstration
purposes.", Version = "0.1.0",
  Author = "Your Name", License = "Rutgers
University"))
```

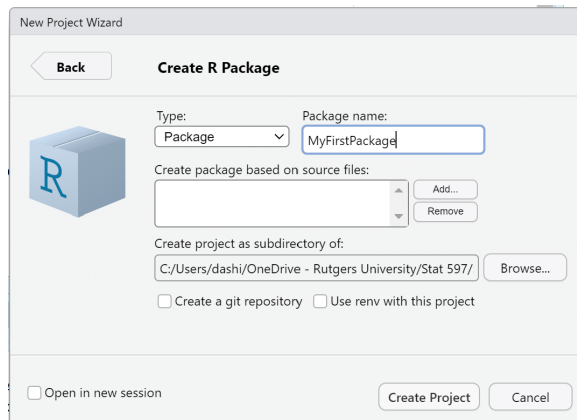


Figure 1: Create a new project



# Setting Up the Package Structure

```
# Load necessary packages
library(usethis)
library(devtools)

# Create a new package
create_package("myPackage")

# Create a new package with a specific path
create_package("path/to/myPackage")

# Create a new package with a specific path and
description
create_package("path/to/myPackage", description =
list(Title = "My Package",
      Description = "A package for demonstration
purposes.", Version = "0.1.0",
      Author = "Your Name", License = "Rutgers
University"))
```

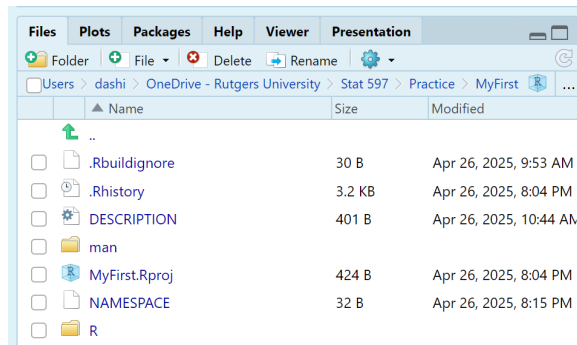


Figure 2: The project looks like this

# Setting the files inside the package

```
DESCRIPTION
1 Package: MyFirst
2 Type: Package
3 Title: What the Package Does (Title Case)
4 Version: 0.1.0
5 Authors@R: c(
6   person(
7     "Jane", "Doe", |
8     email = "jane@example.com",
9     role = c("aut", "cre")
10  )
11 )
12 Description: More about what it does (maybe more than one line).
13   Continuation lines should be indented.
14 License: What license is it under?
15 Encoding: UTF-8
16 LazyData: true
17 RoxygenNote: 7.3.2
18
```

Figure 3: Description file

```
NAMESPACE
1 exportPattern("^[:alpha:]]+")
2

NAMESPACE
1 # Generated by roxygen2: do not edit by hand
2
3 export(plot_line)
4 export(plot_square)
5
```

# Create the functions inside the foldet R

```
# Function to plot a line
plot_line <- function(m, b, x = c(1:100)) {
  y <- m * x + b
  plot(x, y, type = "l", col = "blue", xlab = "x", ylab = "y")
  title("Line Plot")
}

# Function to plot a square
plot_square <- function(a, c, x = c(1:100)) {
  y <- (a + x)^2 + c
  plot(x, y, type = "l", col = "red", xlab = "x", ylab = "y")
  title("Square Plot")
}
```

# Create the documentation

```

#'Plot a line
#'
#'@description
#' Plot a line with slope m and intercept b
#'@param m slope of the line
#'@param b intercept of the line
#'@param x vector of x values
#'
#'@examples
#' plot_line(2,3)
#' plot_line(0,2,x=c(1:10))
#'
#'@return A plot of the line
#'
#'@export
plot_line <- function(m, b, x = c(1:100)) {
  y <- m * x + b
  plot(x, y, type = "l", col = "blue", xlab = "x",
  ylab = "y")
  title("Line Plot")
}

```

```

#'Plot a square
#'Plot a square with a and c
#'@param a coefficient of x
#'@param c constant term
#'@param x vector of x values
#'
#'@examples
#' plot_square(2,3)
#' plot_square(0,2,x=c(1:10))
#'
#' @return A plot of the square
#'
#'
#'@export
plot_square <- function(a, c, x = c(1:100)) {
  y <- (a + x)^2 + c
  plot(x, y, type = "l", col = "red", xlab = "x",
  ylab = "y")
  title("Square Plot")
}

```

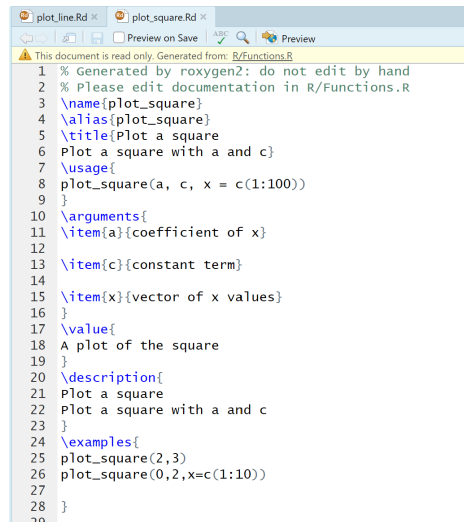
# Create the documentation in the Rd files

```
# Load the devtools package, which helps to create the
# package
library(devtools)

# Load the roxygen2 package, which helps to create the
# documentation
library(roxygen2)

# Load the package
load_all()

# Create the documentation
roxygenise()
```



```
plot_line.Rd x plot_square.Rd x
Preview on Save Preview
This document is read only. Generated from: R/Functions.R
1 % Generated by roxygen2: do not edit by hand
2 % Please edit documentation in R/Functions.R
3 \name{plot_square}
4 \alias{plot_square}
5 \title{Plot a square}
6 Plot a square with a and c
7 \usage{
8   plot_square(a, c, x = c(1:100))
9 }
10 \arguments{
11   \item{a}{coefficient of x}
12
13   \item{c}{constant term}
14
15   \item{x}{vector of x values}
16 }
17 \value{
18   A plot of the square
19 }
20 \description{
21   Plot a square
22   Plot a square with a and c
23 }
24 \examples{
25   plot_square(2,3)
26   plot_square(0,2,x=c(1:10))
27
28 }
```

# Using GitHub

projects can be created in GitHub and then downloaded to your computer