R packages & Debugging

Berry Boessenkool, uni-potsdam.de &
Marvin Reich, gfz-potsdam.de
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berry-b@gmx.de
github.com/brry

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Why write an R packages

- Collect your own functions in one place
- Combine functions and documentation in the right way
- Share code with others
- Make your research reproducible !

How and where to publish

- CRAN: official package distribution for R
- github, bitbucket, etc..

What does a package contain

Obligatory:

- description file
- directory "R" with code inside

Optional:

- documentation
- vignettes
- tests
- namespace
- data

Version control with github

- Connect git to Rstudio (kbroman.org/github_tutorial)
- github.com, log in, on "+" in top-right select "New repository", initialize with readme!
- clone or download: copy link
- Rstudio - file - new project - version control - git: paste url and create
- `devtools::setup()`, choose option number to Overwrite 'mhmVis.Rproj'
- Work. Commit. Push. Repeat.

Devtools for package structure creation

```
library(devtools)

create("subfolder/packageName")
setup() # if repos is initialized


check()
```

Now add the functions in bit.ly/swc_rfun

Roxygen for Documentation

Rstudio - Code - Insert Roxygen Skeleton (CTRL + ALT + SHIFT + R)

```
devtools::document() # calls roxygen2::roxygenise()



check()
install()
```

debugging: useful functions

source("projectFuns.R")	execute complete file
traceback()	find error source in sequence of function calls
options(warn=2)	warnings to error. default 0
browser()	go into function environment: `n`, `s`, `f`, `c`, `Q`
options(error=recover)	open interactive session where error occurred
debug(funct)	toggle linewise function execution
undebug(funct)	after calling and fixing funct

```
if(length(input)>1) stop("length must be 1, not ", length(input))
```

`stop`: Interrupts function execution and gives error
`warning`: continues but gives warning
`message`: to inform instead of worry the user

R. Peng (2002): Interactive Debugging Tools in R
D. Murdoch (2010): Debugging in R
H. Wickham (2015): Advanced R: debugging
Example: Pete Werner Blog Post (2013)

practice debugging

- Load your package and correct the functions until `lsc(calib$P, calib$Q, area=1.6)` returns the result below.
- BONUS: commit each change to git.

```
## Error in read.table(qpfile, sep = "\t", dec = ",", header
= TRUE): no lines available in input
## Error in eval(expr, envir, enclos):  Objekt 'qp' nicht
gefunden
## Error in eval(expr, envir, enclos):  Objekt 'qp' nicht
gefunden
## Error in loadNamespace(name):  there is no package called
'berryFunctions'
```

More things

- ...