Writing R packages Tools for Reproducible Research

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Why write an R package?

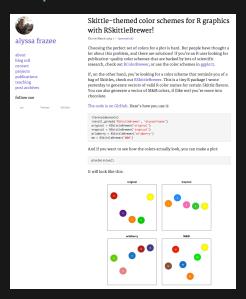
- ▶ To distribute R code and documentation
- To keep track of the misc. R functions you write and reuse
- To distribute data and software accompanying a paper.

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Writing R Extensions Version 3.0.3 (2014-03-06) R Core Team

A simple example: RSkittleBrewer



R package contents

```
RSkittleBrewer/

DESCRIPTION
NAMESPACE

R/RSkittleBrewer.R
R/plotSkittles.R
R/plotSmarties.R

man/RSkittleBrewer.Rd
man/plotSkittles.Rd
man/plotSmarties.Rd
```

DESCRIPTION file

| Package: RSkittleBrewer | Version: 1.1

Author: Alyssa Frazee
Maintainer: Alyssa Frazee <afrazee@jhsph.edu>

License: MIT + file LICENSE

Title: fun with R colors

Description: for those times you want to make plots with...

URL: https://github.com/alyssafrazee/RSkittleBrewer

NAMESPACE file

```
export(RSkittleBrewer)
export(plotSkittles)
export(plotSmarties)
```

An .Rd file

```
\name{RSkittleBrewer}
\alias{RSkittleBrewer}
\title{Candy-based color palettes}
\description{Vectors of colors corresponding to different
             candies.}
\usage{RSkittleBrewer(flavor = c("original", "tropical",
                      "wildberry", "M&M", "smarties"))
\arguments{
  \item{flavor}{Character string for candy-based color
 palette.}
\value{Vector of character strings representing the chosen
       set of colors.}
\examples{
plotSkittles()
plotSmarties()
\keyword{hplot}
\seealso{ \code{\link{plotSkittles}},
          \code{\link{plotSmarties}} }
```

Building, installing, and checking

```
R CMD build RSkittleBrewer
R CMD INSTALL RSkittleBrewer_1.1.tar.gz
R CMD check RSkittleBrewer_1.1.tar.gz
R CMD check --as-cran RSkittleBrewer_1.1.tar.gz
R CMD INSTALL --library=~/Rlibs RSkittleBrewer_1.1.tar.gz
# (~/.Renviron file contains R_LIBS=~/Rlibs)
# On windows:
R CMD INSTALL --build RSkittleBrewer_1.1.tar.gz
```

```
# also consider (within R):
library(devtools)
build("/path/to/RSkittleBrewer")
build("/path/to/RSkittleBrewer", binary=TRUE)
```

Roxygen2 comments

```
RSkittleBrewer
  Candy-based color palettes
   Vectors of colors corresponding to different candies.
   @param flavor Character string for candy-based color palette.
  @export
   Oreturn Vector of character strings representing the chosen...
  @examples
  plotSkittles()
  plotSmarties()
# '
  @seealso \code{\link{plotSkittles}},
# '
     \code{\link{plotSmarties}}
   @keywords hplot
RSkittleBrewer <-
```

Makefile

```
# build package documentation
doc:
   R -e "devtools::document()"
```

.Rbuildignore

Makefile

Include a README or README.md file

```
fun with R Colors
______
If you want high-quality, scientifically-researched color
schemes for your R plots, check out
[RColorBrewer](http://cran.r-project.org/web/packages/RColorBrewer).
If you want your plots to be colored the same way as packs of
Skittles (or M&Ms), then this package (RSkittleBrewer) is the
way to go.
### install
with `devtools`:
...9
devtools::install_github('RSkittleBrewer', 'alyssafrazee')
### use
There are only three functions in this package.
Call `RSkittleBrewer` on a flavor to get a vector of R color
names that correspond to that Skittle flavor.
```

That's it!

Package vignettes

- Include vignettes to show how to use your package.
- It's simplest to use R Markdown.
 - Create a vignettes/ subdirectory.
 - Place a . Rmd file there.
 - The name of the file becomes the name of the vignette.
- ► Include the following in the .Rmd file's YAML header:

```
output: rmarkdown::html_vignette
vignette: >
    %\VignetteIndexEntry{Intro to RSkittleBrewer}
    %\VignetteEngine{knitr::rmarkdown}
    \usepackage[utf8](inputenc)
```

Load the package in an initial chunk

```
library(RSkittleBrewer)
```

Package vignettes

► In the DESCRIPTION file, include:

```
Suggests: knitr, rmarkdown VignetteBuilder: knitr
```

► The following lists the vignettes for a package and then opens a selected vignette.

```
library(RSkittleBrewer)
vignette(package="RSkittleBrewer")
vignette("RSkittleBrewer", "RSkittleBrewer")
```

Optional stuff

- NEWS file describing changes in each version of the package.
- inst/CITATION file describing how to cite your package.
- ▶ inst/doc/ directory any sort of misc. documentation (e.g., pre-compiled computationally heavy vignettes)
- data/ directory containing data
- ▶ src/ directory containing C/C++/Fortran code
- demo/ directory with demonstrations (like vignettes, but to be executed in real-time).
- ▶ tests/ and/or inst/tests/ containing tests.

devtools

Get to know the devtools package.

```
▶ dev mode()
▶ load all()
▶ install github(), install bitbucket, ...
document()
▶ build()
▶ check()
▶ check doc()
► run examples()
▶ test() (next time)
```

Summary

- ► R packages really aren't that hard.
- R packages are really useful.
 - Distributing software and data
 - Organizing code for a paper
 - Organizing your misc. R functions
- ▶ Look at others' packages, and learn from them.
- Adopt the tools in the devtools package.