

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

alysa frazee

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Skittle-themed color schemes for R graphics with RSkittleBrewer!

The 09 March 2014 | [permalink](#)

Choosing the perfect set of colors for a plot is hard. But people have thought a lot about this problem, and there are solutions! If you're an R user looking for publication-quality color schemes that are backed by lots of scientific research, check out [RColorBrewer](#), or use the color schemes in [ggplot2](#).

If, on the other hand, you're looking for a color scheme that reminds you of a bag of Skittles, check out [RSkittleBrewer](#). This is a tiny R package I wrote yesterday to generate vectors of valid R color names for certain Skittle flavors. You can also generate a vector of M&M colors, if (like me) you're more into chocolate.

The code is on [GitHub](#). Here's how you use it:

```
library(devtools)
install_github("RSkittleBrewer", "alysafrzee")
original = RSkittleBrewer("original")
tropical = RSkittleBrewer("tropical")
wildberry = RSkittleBrewer("wildberry")
mm = RSkittleBrewer("MM")
```

And if you want to see how the colors actually look, you can make a plot:

```
plotSkittles()
```

It will look like this:

The figure displays four plots, each showing a different color scheme generated by the RSkittleBrewer package. The plots are arranged in a 2x2 grid. The top-left plot is labeled 'original' and shows a collection of colored circles in shades of red, yellow, purple, orange, and green. The top-right plot is labeled 'tropical' and shows a collection of colored circles in shades of orange, blue, pink, green, and yellow. The bottom-left plot is labeled 'wildberry' and shows a collection of colored circles in shades of green, blue, red, purple, and pink. The bottom-right plot is labeled 'MM' and shows a collection of colored circles in shades of red, yellow, brown, blue, green, and orange.

alysafrzee.com/RSkittleBrewer.html

4

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
#' @return Vector of character strings representing the chosen...
#'
#' @examples
#' plotSkittles()
#' plotSmarties()
#'
#' @seealso \link{plotSkittles},
#'          \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`:

```
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.