

# Writing R packages

## Tools for Reproducible Research

Karl Broman

Biostatistics & Medical Informatics, UW–Madison

`biostat.wisc.edu/~kbroman`

`github.com/kbroman`

`@kwbroman`

Course web: [bit.ly/tools4rr](https://bit.ly/tools4rr)

# 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.

# Writing R Extensions

---

Version 3.0.3 (2014-03-06)

R Core Team

---

# A simple example: RSkittleBrewer



alyssa frazee

about  
blog roll  
contact  
projects  
publications  
teaching  
post archives

follow me

rss Twitter GitHub

## Skittle-themed color schemes for R graphics with RSkittleBrewer!

The 06 March 2014 | [journals](#)

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.

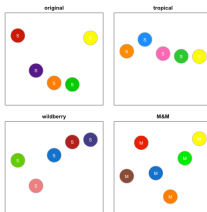
The code is on [GitHub](#). Here's how you use it:

```
library(devtools)
install_github("RSkittleBrewer", "alyssafraze")
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:



# 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
```

# 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 'library(devtools);document(roclets=c("namespace", "rd"))'
```

# .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`:
```

```
```s
```

```
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 demonstrate the use of 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 at the top of the `.Rmd` file

```
%\VignetteEngine{knitr::knitr}  
%\VignetteIndexEntry{Intro to RSkittleBrewer}
```

- ▶ Load the package in an initial chunk

```
library(RSkittleBrewer)
```

# Package vignettes

- ▶ Add the following line to your DESCRIPTION file.

```
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)
- ▶ 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/ directories containing software tests.

# 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.