Spatial Analysis and Mapping Workshop

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Preliminaries

This workshop will involve a large collection of R packages and will provide a basic run through for accessing spatial data, spatial plotting and integrating with the 'ggplot' packages. Last we will perform some simple spatial statistics.

From CRAN

Required

```
install.packages("sp")
install.packages(rgeos)
install.packages(maptools)
```

Recommended

```
install.packages("rgdal")
```

US Census Packages

In this workshop we will use a series of different packages, including the US Census suite of software. The most recent versions are available https://r-forge.r-project.org/R/?group_id=2022. We will need only three of the packages:

```
install.packages("UScensus2010", repos = "http://R-Forge.R-project.org")
install.packages("UScensus2010county", repos = "http://R-Forge.R-project.org")
install.packages("UScensus2010tract", repos = "http://R-Forge.R-project.org")
```

Zillow Neighborhoods

We are going to use some data from http://zillow.com which will allow us to work with the neighborhoods of Seattle! You can download the neighborhoods directly at http://www.zillow.com/howto/api/neighborhood-boundaries.htm.

Package requirements

This function requires 'rgdal', if you were not able to instal 'rgdal' the data file is provided on the github repository as 'seattle_nb.rda'.

```r
require(rgdal)
```

Function for downloading Zillow Neighborhoods

```r
readZillow_NB <- function(address, state, city = NULL) {
    fileName <- paste(address, "ZillowNeighborhoods-", state,
        ".zip", sep = "")  ##full address of zip file
    zipFile <- paste("ZillowNeighborhoods-", state, ".zip", sep = "")
    zipdir <- tempfile()  ### Create temp file
    dir.create(zipdir)  ### Create a folder in the temp file
    download.file(fileName, destfile = paste(zipdir, zipFile,
        sep = "/"))
    unzip(paste(zipdir, zipFile, sep = "/"), exdir = zipdir)
    files <- list.files(zipdir)
    sp_temp <- rgdal::readOGR(dsn = zipdir, layer = strsplit(files[grep("shp",
        paste(files, "0", sep = ""))], "\\.")[[1]][1])
    if (!is.null(city)) {
        sp_temp_city <- sp_temp[sp_temp$CITY == city, ]
        return(sp_temp_city)
    }
    sp_temp
}
```

Zillow Logo

Zillow requires that you add their logo to any plot using their data. Below is a quick script for doing such a task. This requires the package 'caTools'.

```r
install.packages("caTools")
install.packages("RCurl")
```

```r
library(caTools)


zillowurl <- "http://www.zillowstatic.com/vstatic/70a941d/static/logos/Zillow_Logo_HoodsProvided_RightA
zillow_logo <- read.gif(zillowurl, flip = TRUE)

## Plot the logo!
image(zillow_logo$image, col = zillow_logo$col, breaks = (0:length(zillow_logo$col)) -
    0.5, asp = 0.15, useRaster = TRUE, axes = FALSE)
```


Seattle Neighborhoods

```r
base_address <- "http://www.zillow.com/static/shp/"
state <- "WA"
city <- "Seattle"
seattle_nb <- readZillow_NB(base_address, state, city)
```

```
## OGR data source with driver: ESRI Shapefile
## Source: "/var/folders/y5/f2xwbx9d46z7m05mmqwr27_r0000gn/T//RtmpDhTdxJ/file11ba4c44cf4", layer: "Zill
## with 299 features
## It has 5 fields
```

Plot Seattle Neighborhoods

```r
par(mfrow = c(1, 1), mar = c(0, 0, 0, 0) + 0.1)
plot(seattle_nb)
par(fig = c(0.25, 3.5, 0.4, 2.5)/10, new = TRUE)
image(zillow_logo$image, col = zillow_logo$col, breaks = (0:length(zillow_logo$col)) -
    0.5, asp = 0.15, useRaster = TRUE, axes = FALSE)
```