0 Introduction

1. RStudio
    a. What's an IDE?
    b. Tour R Studio – what are all the panes?
    c. R Projects
2. Scripting basics
    a. What is a script
    b. Comments
    c. How to run code from a script
3. Scratching the surface in R
    a. Basic arithmetic (R is a calculator)
    b. Creating and using variables (<- and =)
    c. Functions
        i. Using functions (), arguments, and naming arguments
        ii. Getting help with a function
4. Installing and using packages
    a. What's a package
    b. Installing with install.packages()
    c. Loading with library()
5. R Markdown

1 Get

1. R as a calculator
    a. Operators +, -, *, /, ^, %%
    b. Order of operations and grouping with ()
    c. Comparison operators >, <, <=, >=, ==, !=
2. Naming and storing objects
    a. Assignment operators <-, =
    b. Variable names can be long, include numbers, _, and .
3. Data types
    a. Numeric
    b. Character/string
    c. Logical
    d. Missing values
        i. is.na
4. Data structures
    a. Vectors
        i. Math and comparison with vectors
        ii. String helper functions
    b. Data frames
        i. Columns are vectors
        ii. Helper functions for data frames (class, nrow, ncol, names, summary, head, tail)
5. Reading data
    a. read.csv, read_csv
    b. readRDS

2 Clean

1. Sub-setting with base R
    a. Vectors []
        i. Numbers
        ii. Negative numbers to drop members
        iii. Repeated numbers
        iv. Logicals and logical tests
    b. Data frames [rows, columns]
        i. Each column is a vector (so extracting single columns gives you a vector)
        ii. Money sign $
        iii. Adding columns
        iv. Each row is a data frame
        v. Binding rows with rbind
2. Working with dplyr
    a. Data always comes first in dplyr functions
    b. Select (pull columns from a data frame)
    c. Filter (pull rows from a data frame)
    d. Mutate (add columns to a data frame)
    e. Chaining together multiple dplyr functions
3. Joining ("merging") data
    a. dplyr functions for joining
    b. by
    c. Types of joins
4. Writing data
    a. write.csv, write_csv
    b. saveRDS

3 Explore

1. Summary statistics
    a. summary
    b. max, min, mean, median
    c. quantiles
2. Summarizing with dplyr
    a. group_by and summarize
3. Basic plots
    a. plot(x, y)
    b. boxplot(x)
    c. boxplot(x ~ group, data)

4 Analyze

1. Basic statistical tests
    a. t.test()
        i. set.seed()
        ii. Make two normal populations with rnorm

        iii. names, summary
    b. There's a test for that
2. Regression models
    a. lm(y ~ x, data)
        i. summary
        ii. add the line to a plot
    b. lm(y ~ x1 + x2, data)

5 Visualize

1. Create plots with ggplot()
2. Map aesthetics with aes()
3. Add points with geom_point()
4. Add scales with scale_y_log10()
5. Add a title with ggtitle()
6. Add color as an aesthetic and scale with
    a. scale_color_gradient()
7. Edit plot appearance with theme()
    a. (panel.background = element_blank())
    b. theme_bw()
    c. theme_dark()
    d. theme_minimal()

6 Repeat

1. If/else
2. For loops
3. Functions

8 dataRetrieval U.S.

1. Downloading data from NWIS
    a. readNWISdata
    b. readNWISdv
    c. readNWISuv
    d. readNWISqw
    e. renameNWIScolumns
2. Discovering available data
    a. whatNWISdata
    b. whatNWISsites
3. Plotting and mapping with resulting data