R: One-day Workshop

Lesson 1: Welcome to the R Project
Lesson 2: Introduction to RStudio
Lesson 3: Working with vectors
Lesson 4: Working with data frames
Lesson 5: Reading, writing and exploring data frames
Lesson 6: Data manipulation with dplyr
Lesson 7: Data manipulation with dplyr, continued
Lesson 8: R for data visualization
Lesson 9: Capstone

Learning Objectives

- Student can install and load an R package
- Student can navigate the RStudio integrated development environment
- Student can create, inspect and modify vectors
- Student can create, inspect and modify data frames
- Student can read, write and analyze tabular external files
- Student can perform common data manipulation tasks with dplyr
- Student can perform more advanced data manipulation with dplyr
- Student can create graphics in R using visualization best practices
- Student can complete end-to-end data exploration project in R

Lesson plan developed by George Mount. For more resources like this, visit stringfestanalytics.com
Lesson 1: Welcome to the R Project
Objective: Student can install and load an R package
Description:
• What is R and when would I use it?
• R plus RStudio
• Installing and loading packages
Exercise: Install a CRAN task view
Assets needed: None
Time: 35 minutes

Lesson 2: Introduction to RStudio
Objective: Student can navigate the RStudio integrated development environment
Description:
• Basic arithmetic and comparison operations
• Saving, closing and loading scripts
• Opening help documentation
• Plotting graphs
• Assigning objects
Exercise: Practice assigning and removing objects
Assets needed: None
Time: 40 minutes

Lesson 3: Working with vectors
Objective: Student can create, inspect and modify vectors
Description:
• Creating vectors
• Vector operations
• Indexing elements of a vector
Exercise: Drills
Assets needed: None
Time: 35 minutes

Lesson 4: Working with data frames
Objective: Student can create, inspect and modify data frames
Description:
• Creating a data frame
• Data frame operations
• Indexing data frames
• Column calculations
• Filtering and subsetting a data frame
• Conducting exploratory data analysis on a data frame
Exercise: Drills
Assets needed: Iris dataset
Time: 70 minutes

Lesson 5: Reading, writing and exploring data frames
Objective: Student can read, write and analyze tabular external files
Description:
• Reading and writing csv and txt files
• Reading and writing Excel files
• Exploring a dataset
• Descriptive statistics
Exercise: Drills
Assets needed: Iris dataset
Time: 40 minutes

Lesson 6: Data manipulation with dplyr
Objective: Student can perform common data manipulation tasks with dplyr
Description:
• Manipulating rows
• Manipulating columns
• Summarizing data
Exercise: Drills
Assets needed: Airport flight records
Time: 50 minutes
Lesson 7: Data manipulation with dplyr, continued
Objective: Student can perform more advanced data manipulation with dplyr
Description:
- Building a data pipeline
- Joining two datasets
- Reshaping a dataset
Exercises: Drills
Assets needed: Airport flight records
Time: 50 minutes

Lesson 8: R for data visualization
Objective: Student can create graphs in R using visualization best practices
Description:
- Graphics in base R
- Visualizing a variable's distribution
- Visualizing values across categories
- Visualizing trends over time
- Graphics in ggplot2
Exercises: Drills
Assets needed: Airport flight records
Time: 70 minutes

Lesson 9: Capstone
Objective: Student can complete end-to-end data exploration project in R
Assets needed: Baseball records
Time: 40 minutes