

Introduction to R Programming for Programmers

Code:	ACCEL-R-PROG
Length:	3 days
URL:	View Online

Accelebrate's Introduction to R course teaches programmers how to use the R programming language to explore data from a variety of sources by building inferential models and generating charts, graphs, and other data representations.

Skills Gained

All students will:

- Master the use of the R and RStudio interactive environment
- Expand R by installing R packages
- Explore and understand how to use the R documentation
- Read Structured Data into R from various sources
- Understand the different data types in R
- Understand the different data structures in R
- Understand how to create and manipulate dates in R
- Use the tidyverse collection of packages to manipulate dataframes
- Write user-defined R functions
- Use control statements
- Write Loop constructs in R
- Use the apply family of functions to iterate functions across data
- Expand iteration and programming through the Purrr package
- Reshape data from long to wide and back to support different analyses
- Perform merge operations with R
- Understand split-apply-combine (group-wise operations) in R
- Identify and deal with missing data
- Manipulate strings in R
- Understand basic regular expressions in R
- Understand base R graphics
- Focus on GGplot2 graphics for R for generating charts
- Use RMarkdown to programmatically generate reproducible reports
- Use R for descriptive statistics
- Use R for inferential statistics
- Write multivariate models in R (general linear models)
- Understand confounding and adjustment in multivariate models

- Understand interaction in multivariate models
- Predict/Score new data using models
- Understand basic non-linear functions in models
- Understand how to link data, statistical methods, and actionable questions

Prerequisites

Students should have knowledge of basic statistics (t-test, chi-square-test, regression) and know the difference between descriptive and inferential statistics. Extensive prior experience in a modern programming language is required.

Course Details

Software Requirements

- R 3.0 or later with console
- IDE or text editor of your choice (RStudio recommended)

Outline

Overview

- History of R
- Advantages and disadvantages
- Downloading and installing
- How to find documentation

Introduction

- Using the R console and RStudio
- Getting help
- Learning about the environment
- Writing and executing scripts
- Object-oriented programming
- Introduction to vectorized calculations
- Introduction to data frames
- Installing and loading packages
- Working directory
- Saving your work

Variable types and data structures

- Variables and assignment
- Data types
- Numeric, character, boolean, and factors
- Data structures
- Vectors, matrices, arrays, dataframes, lists

- Indexing, subsetting
- Assigning new values
- Viewing data and summaries
- Naming conventions
- Objects

Getting Data into the R Environment with readr

- Built-in data
- Reading data from structured text files
- Reading data using ODBC

Dataframe manipulation with dplyr

- Introduction to tibbles, enhanced data frames
- Renaming columns
- Adding new columns
- Binning data (continuous to categorical)
- Combining categorical values
- Transforming variables
- Handling missing data
- Merging datasets together
- Stacking datasets together (concatenation)

Handling Dates in R using Lubridate

- Date and date-time classes in R
- Formatting dates for modeling

Exploratory Data Analysis (descriptive statistics)

- Continuous data
- Distributions
- Quantiles, mean
- Bi-modal distributions
- Histograms, box-plots
- Categorical data
- Tables
- Barplots
- Group by calculations with dplyr
- Split-apply-combine
- Applying functions across dimensions
- Sapply, lapply, apply
- Programming with map and purrr

Advanced R Graphics: ggplot2

- Understanding the grammar of graphics
- Quick plots (qplot function)
- Building graphics by pieces (ggplot function)
- Understanding geoms (geometries)
- Linking chart elements to variable values
- Controlling legends and axes
- Exporting graphics

General Linear Regression Models in R

- Understanding formulas
- Linear and logistic regression models
- Regression plots
- Confounding / interaction in regression
- Evaluating residuals
- Scoring new data from models (prediction)
- Useful plots from regression models

Conclusion

Schedule (as of 1)

Date	Location
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