Teaching an introductory programming course with R

Reto Stauffer, J Chimiak-Opoka, LM Rodriguez-R & A Zeileis
www.uibk.ac.at/disc
DiSC: Digital Science Center

• Part of the digitalization initiative at the Universität Innsbruck
• Interdisciplinary synergies between computer science, mathematics, statistics and other scientific disciplines
Teaching @ DiSC

Introduction to programming

- First course in DiSC minor
- For programming novices
- Alternatively: Either Python or R
- Focus on data types, classes, control flow, etc.
- Data analysis later

Minor Digital Science

- Introduction to programming
- Data management
- Data analysis I
- Data analysis II
- Aspects of digitalization
- Data analysis lab
Content

Core infrastructure and program flow
- Installation, IDE
- Vectors
- Matrices
- Functions & testing
- Conditional execution
- Loops
- Preparation session
- Mid-term examination

Data structures and management
- Lists & data frames
- Data classes & methods
- Reading and writing
- Data management
- Preparation session
- Final examination
- Closing session
Course flow

Flipped classroom design

in class
- welcome session
- practical exercises
- extra content
- weekly quiz
- Q&A
- finish exercises
- prepare new content
- weekly quiz
- prepare new content
- Q&A

out of class
- useR! 2021: The R Conference
7.2 If statements

Based on the logical expression discussed above we can now declare the conditions that control the flow of scripts or functions. Let us start with the most basic version: a single if statement.

**Basic usage:** if (condition) { action }.

- The `condition` has to be a single logical `TRUE` or `FALSE`.
- If `condition` is evaluated to `TRUE`, the `action` is executed.

For example we want R to inform us via `cat()` that the variable `x` is smaller than 10 in case this is true.

```r
x <- 8
if (x < 10) { cat("x is smaller than 10\n") }
```

```r
## x is smaller than 10
```

The condition (here: `x < 10`) is always within round brackets `if (...)`, the action is everything.
Technologies

**bookdown**
for the book

**R/exams**
for online quizzes and cloze questions
with file upload for examination

**tinytest**
for self assessment during exercises and exams
Thank you for your interest!

@retostauffer2
Reto.Stauffer@uibk.ac.at