



Fundamentals in Ecology Practicals

Week 4

Introduction to R

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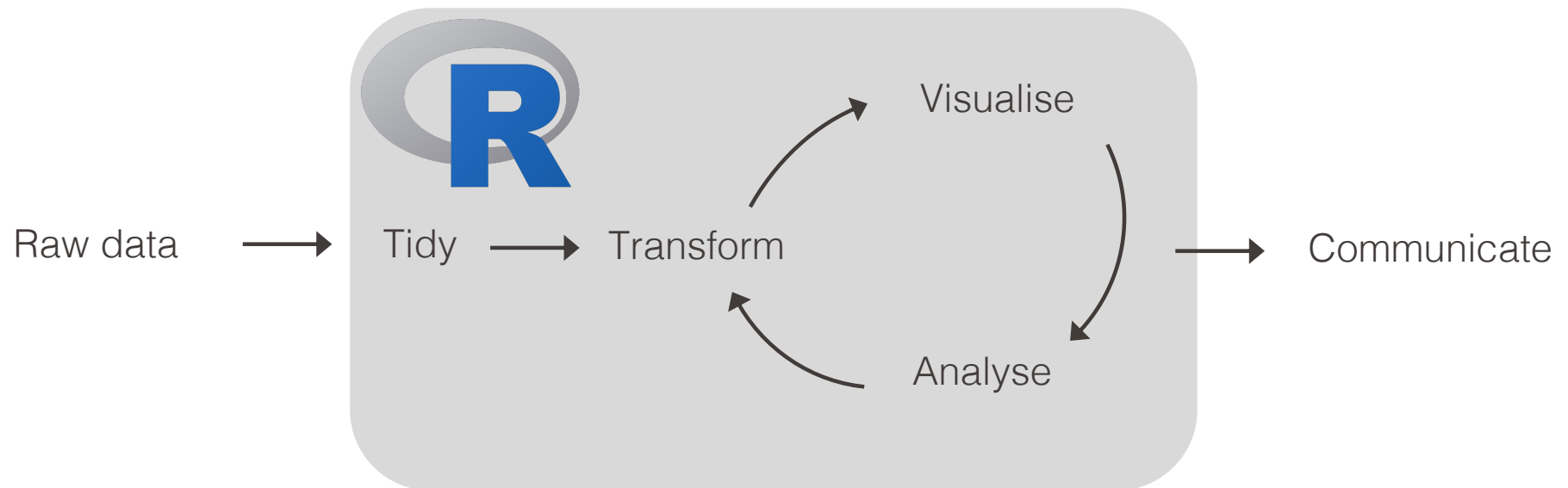
Overview

Aim of the course

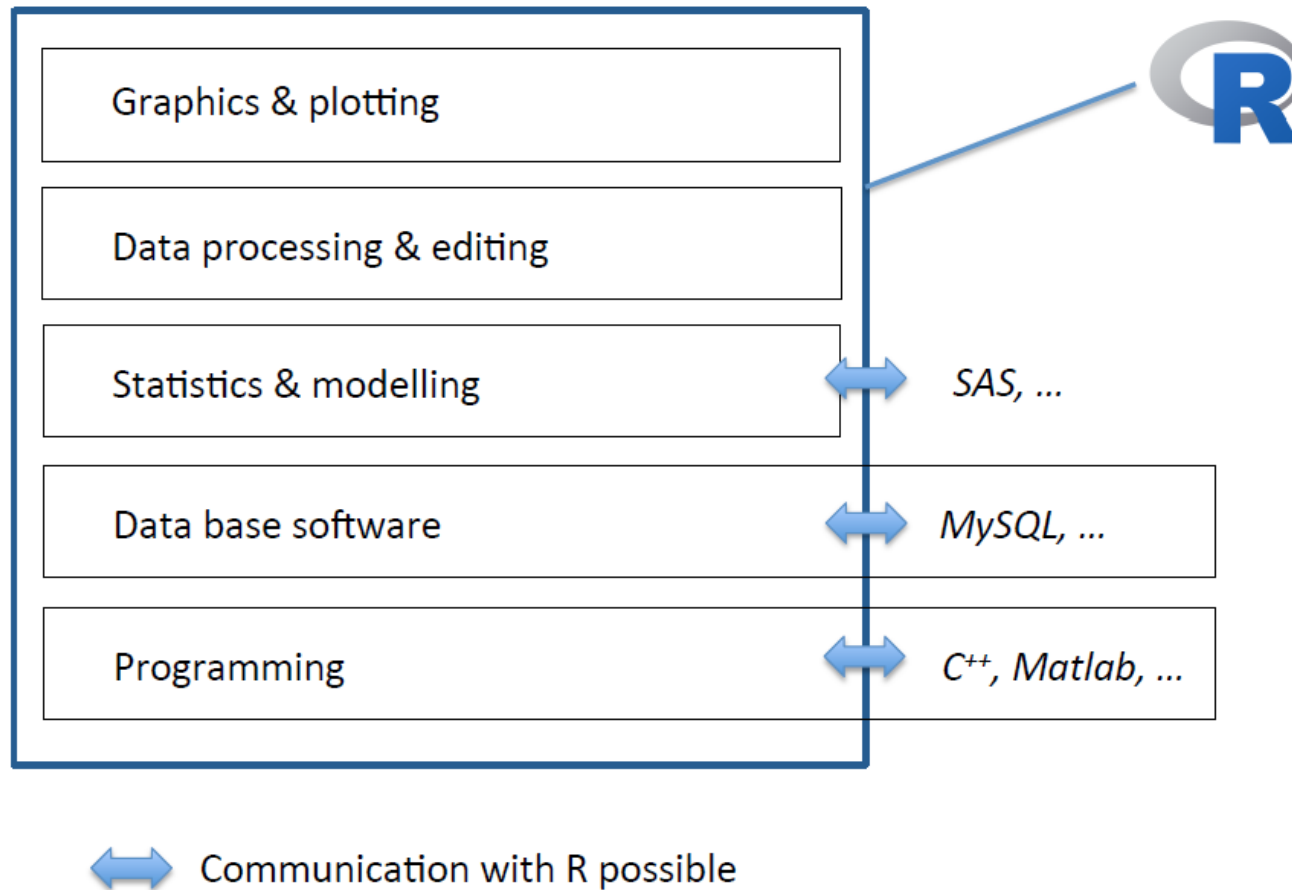
At the end of our R courses you are able to:

- Write and debug your own code in RStudio
- Apply RStudio for basic data transformation, reading in and writing out data
- Create and export high quality figures
- Use R for basic statistical analyses

Why use R?



Why use R?

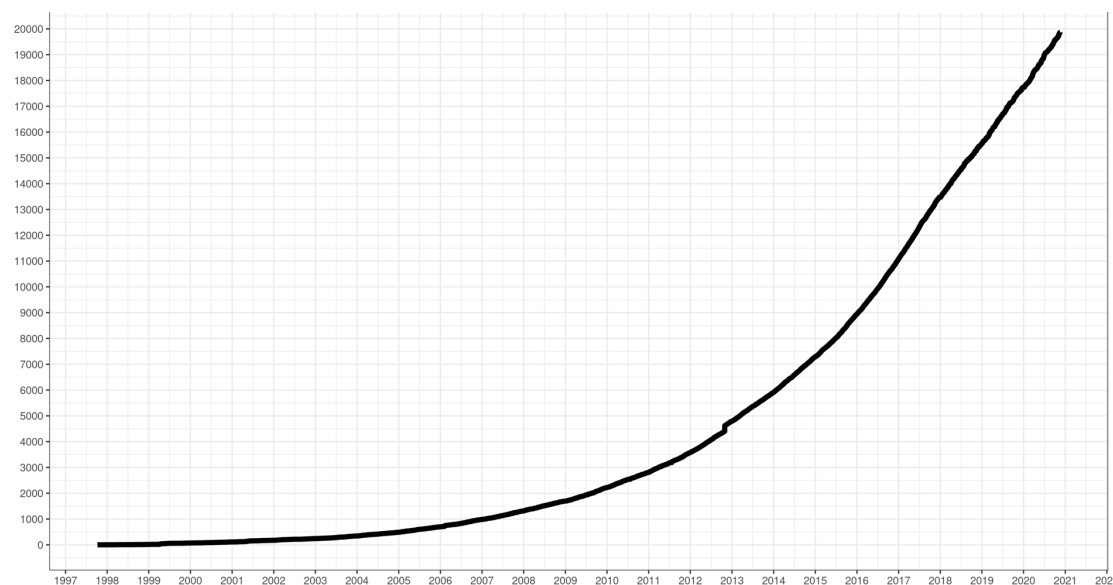


Why use R?

R packages

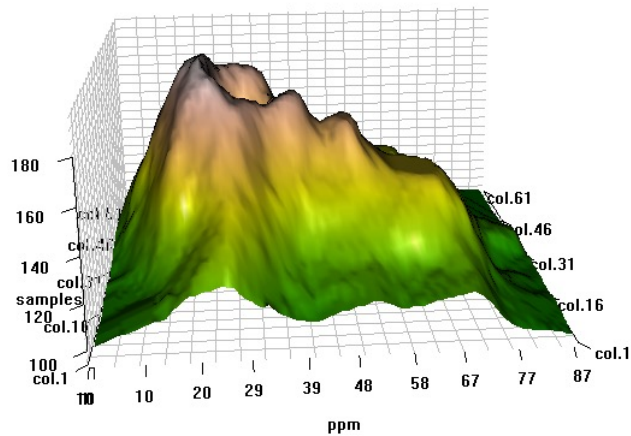


Number of R packages



Why use R?

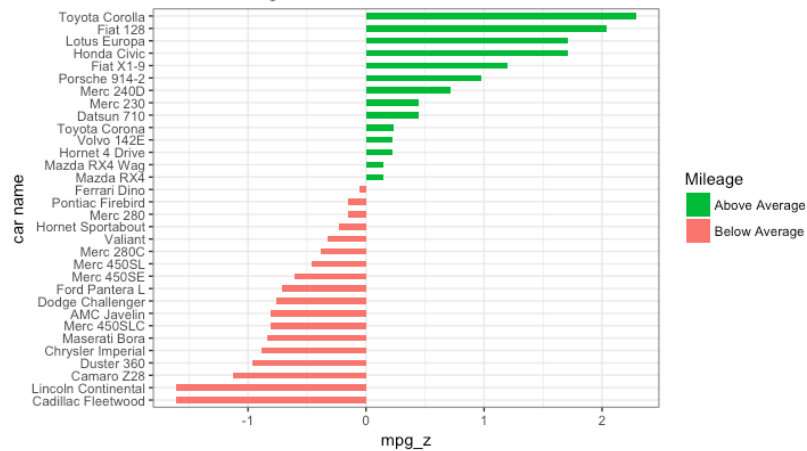
plot3d volcano



<https://stackoverflow.com/questions/41150858>

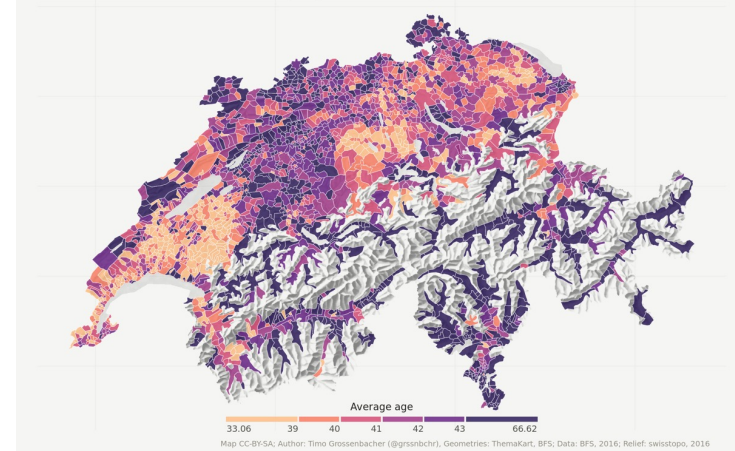
Diverging Bars

Normalised mileage from 'mtcars'



<http://r-statistics.co/Top50-Ggplot2-Visualizations-MasterList-R-Code.html>

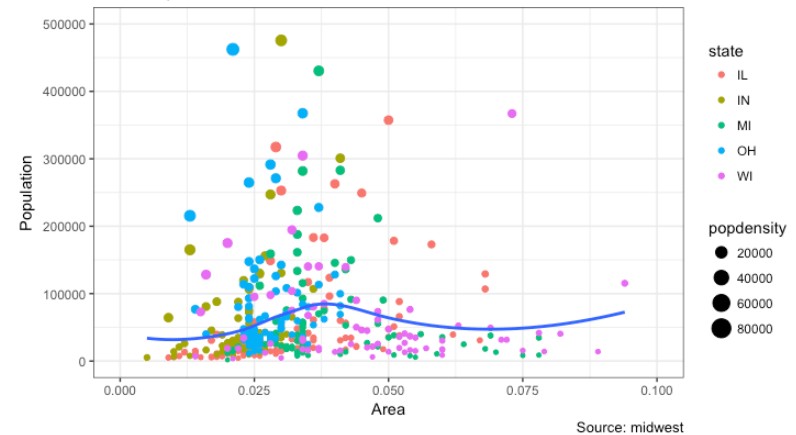
Switzerland's regional demographics
Average age in Swiss municipalities, 2015



<https://timogrossenbacher.ch/2016/12/beautiful-thematic-maps-with-ggplot2-only/>

Scatterplot

Area Vs Population



<http://r-statistics.co/Top50-Ggplot2-Visualizations-MasterList-R-Code.html>

Coding in R

Challenges

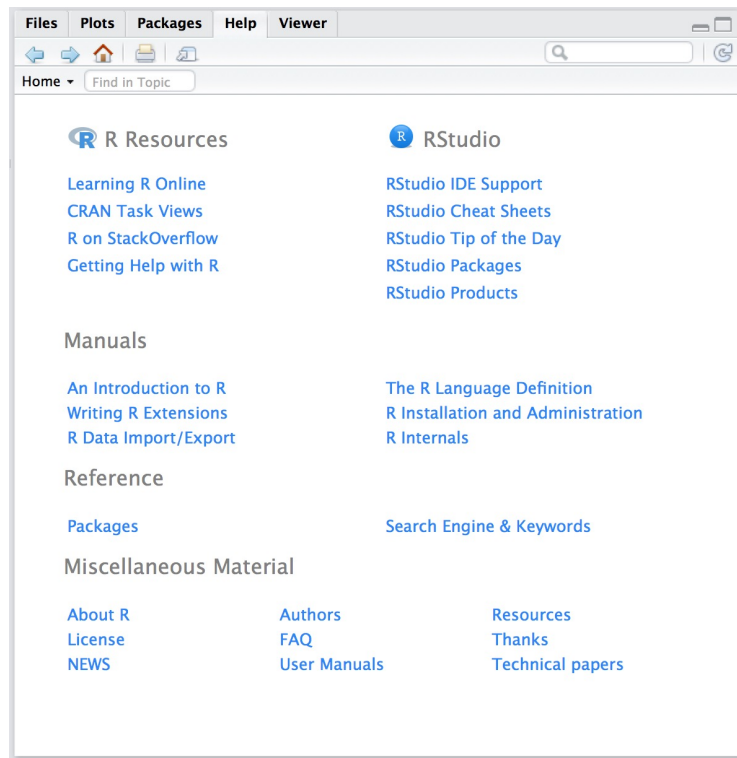
- Learning a new syntax
- The built-in R help is not very helpful and difficult to understand
- Many functions in many packages, difficult to memorise

Mindset and practical advices

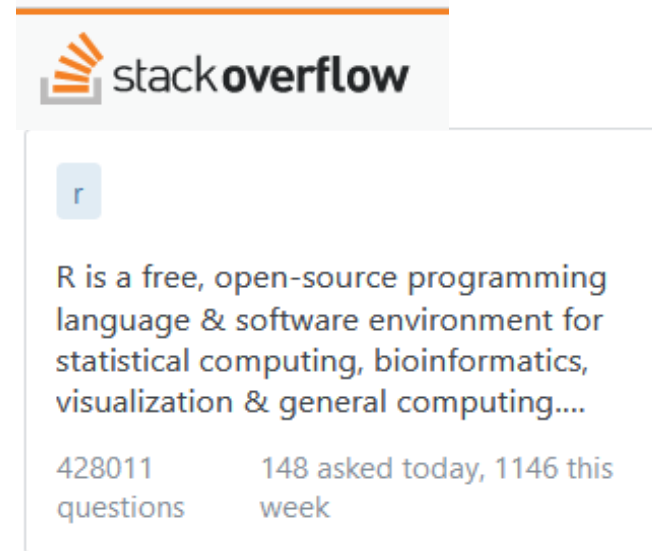
- Frustration is and will remain part of the process
- Ask questions, work in teams, get inputs
- There's huge online help for almost all problems
- Use cheat sheets, create your own cheat sheets
- Try GPT (OpenAI), R1 (DeepSeek), Grok (xAI), Llama (Meta) or the like, but don't rely on it
- There are many different roads that lead to the objective
- Let the problem rest for a while, sometimes the solutions comes next day

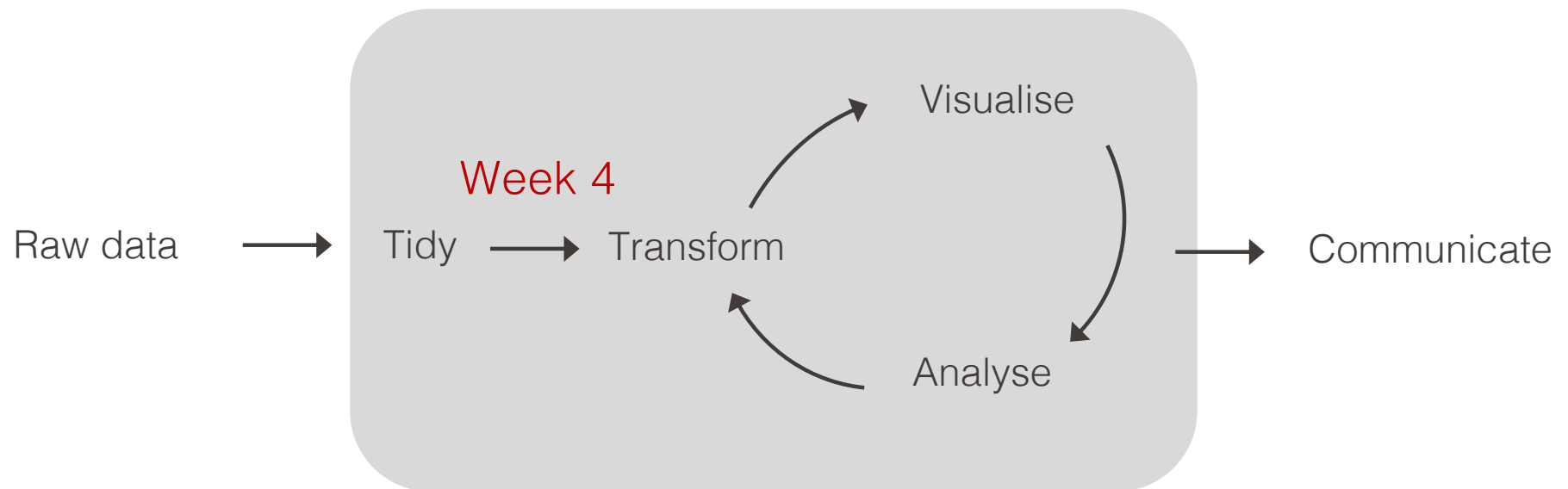
Coding in R

Built-in help



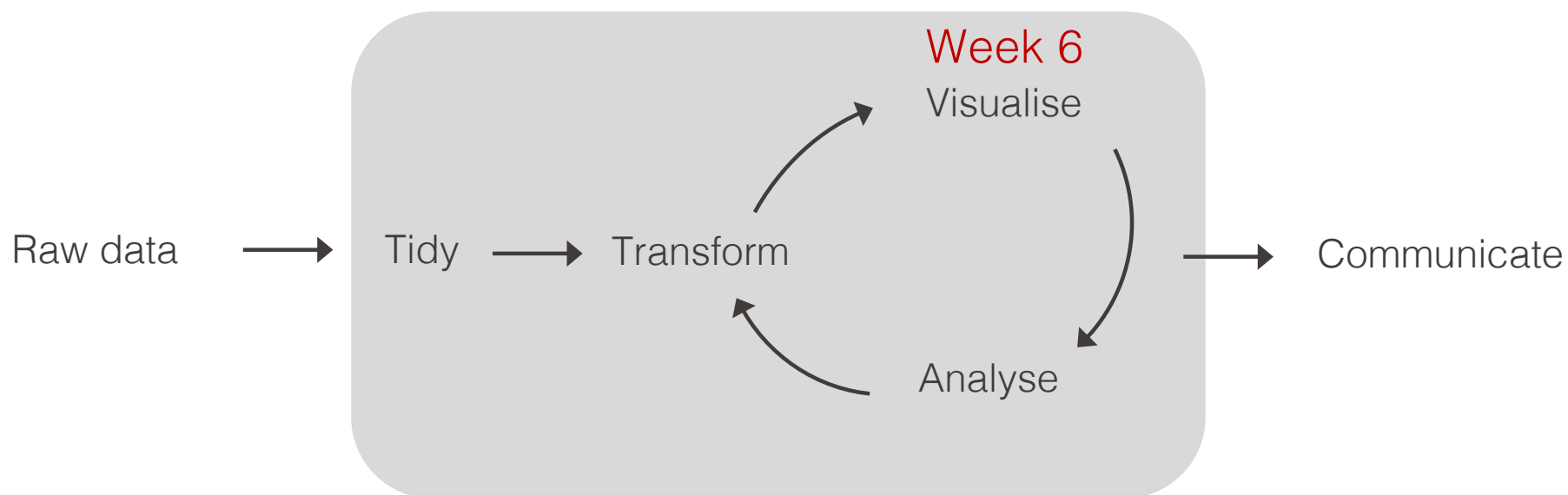
Online help: Stack overflow





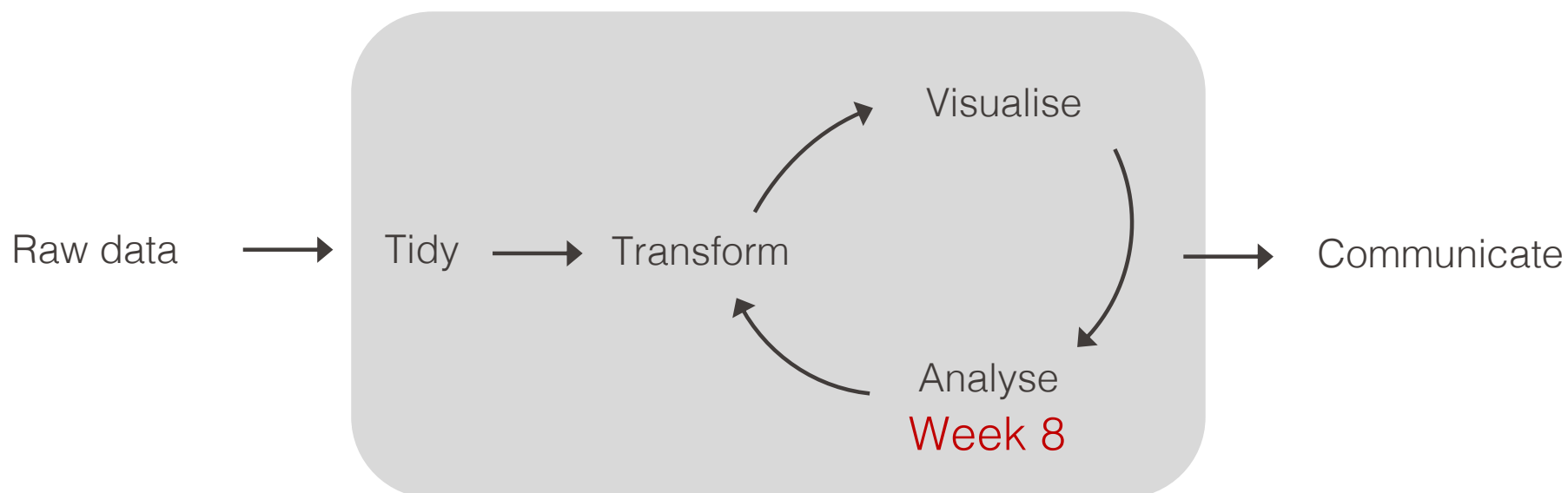
Week 4

Introduction to the R environment, basic operations and data manipulation



Week 6

Data visualisation in R



Week 8

How to do statistical analyses in R

Lecture overview

1. How does an R session look like? How does RStudio work?
2. Learning the syntax
 - Do calculations
 - Understand object classes
 - Read in data
 - Apply functions
 - Manipulate vectors
 - Manipulate dataframes
 - Write out data
3. Do the exercises on moodle until 27.3.2025

What you need to have ready by now

1. Download both R and RStudio from here and install it:
 - <https://stat.ethz.ch/CRAN/>
 - <https://www.rstudio.com/products/rstudio/download/>
2. Find the following important special characters on your keyboard:
 - [] Square brackets
 - { } Curly brackets
 - \$ Dollar key
 - # Hash key
 - ~ Tilde
 - | Vertical bar