Introduction to R Programming

Course Overview

This introductory course is designed to familiarize participants with the fundamental concepts of R programming. The goal is to equip learners with a strong foundation to explore data analysis, statistical modeling, and visualization using R. By the end of the course, participants will be confident in navigating the R environment, writing basic R scripts, and implementing simple data-driven solutions.

Objectives

- Understand the R Programming Environment
- Learn basic syntax and data types in R.
- Perform data manipulation using essential R packages.
- Create basic data visualizations using R tools.
- Develop problem-solving skills using R programming.

Expected Outcomes

By the end of the course, participants will:

- Be familiar with the RStudio interface and workflow.
- Understand and apply basic R syntax and constructs.
- Perform data cleaning and basic transformations.
- Create simple visualizations to communicate insights effectively.
- Be ready to advance into intermediate R topics.

Day-by-Day Schedule

Day 1: Setting the Foundations

Time	Topic	Description
9:00 AM - 9:30 AM	Welcome and Introduction	Overview of the course objectives, expectations, and tools used.
9:30 AM - 10:30 AM	Installing and Exploring RStudio	Installing R and RStudio, overview of the interface, basic setup.
10:30 AM - 10:45 AM	Break	Short refreshment break.
10:45 AM - 12:00 PM	Basic R Syntax and Variables	Introduction to R syntax, variable assignment, and operators.
12:00 PM - 1:00 PM	Lunch	Lunch break.
1:00 PM - 2:30 PM	Data Types and Data Structures	Exploring vectors, lists, matrices, and data frames.
2:30 PM - 2:45 PM	Break	Short refreshment break.
2:45 PM - 4:00 PM	Flow control structures. Hands-on Practice: Basic Calculations in R	Exercises to reinforce basic syntax and operations in R.

Day 2: Data Handling and Manipulation

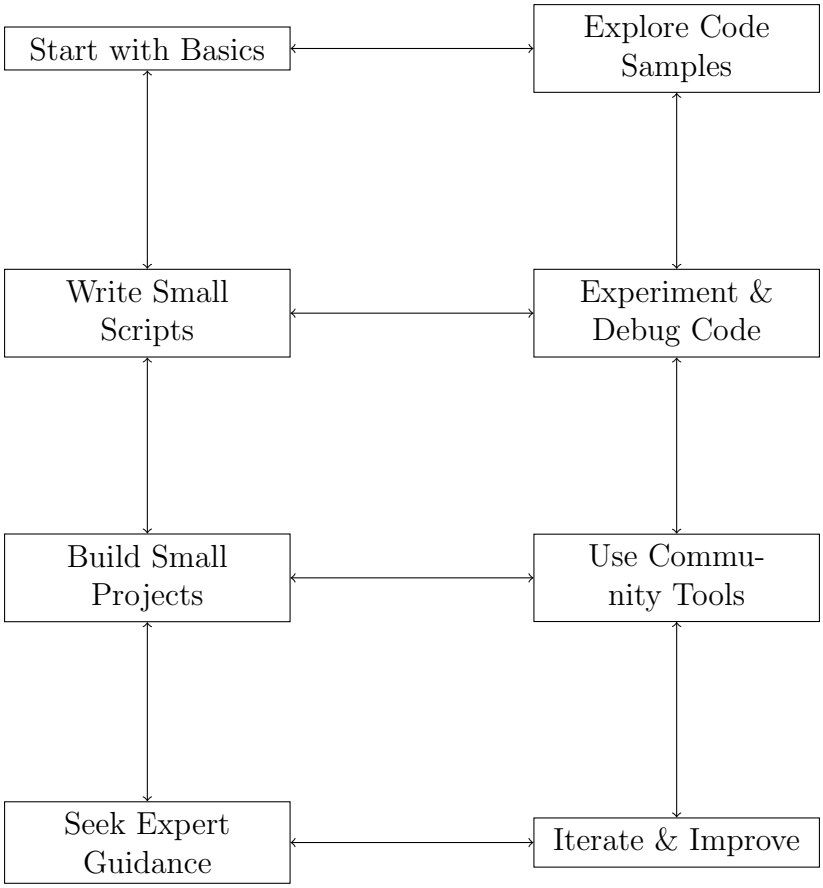
Time	Topic	Description
9:00 AM - 9:15 AM	Recap and Questions from Day 1	Quick recap of Day 1 topics, addressing any questions.
9:15 AM - 10:30 AM	Importing Data	Loading CSV, Excel, and database files into R.
10:30 AM - 10:45 AM	Break	Short refreshment break.
10:45 AM - 12:00 PM	Cleaning Data	Handling missing values, duplicates, and inconsistent data.
12:00 PM - 1:00 PM	Lunch	Lunch break.
1:00 PM - 2:15 PM	Data Manipulation with `dplyr` and `tidyr`	Introduction to filtering, grouping, summarizing, and reshaping data.
2:15 PM - 2:30 PM	Break	Short refreshment break.
2:30 PM - 4:00 PM	Hands-on Practice: Data Wrangling	Practice exercises on data manipulation using provided datasets.

Day 3: Visualizations and Practice

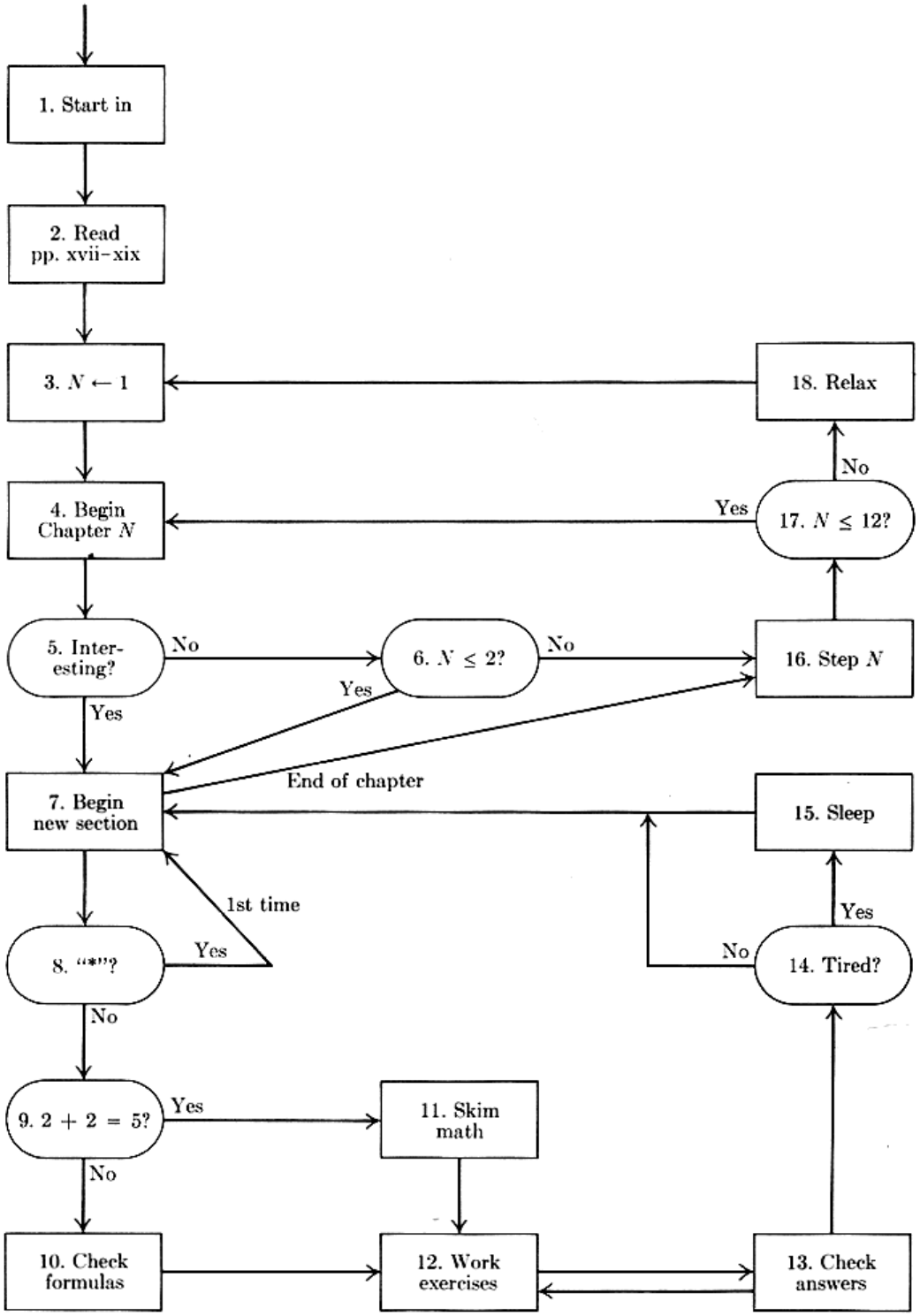
Time	Topic	Description
9:00 AM - 9:15 AM	Recap and Questions from Day 2	Quick recap of Day 2 topics, addressing any questions.
9:15 AM - 10:45 AM	Introduction to `ggplot2`	Basics of creating plots: scatter, bar, and line plots.
10:45 AM - 11:00 AM	Break	Short refreshment break.
11:00 AM - 12:00 PM	Customizing Plots	Adding labels, adjusting themes, and annotating plots.
12:00 PM - 1:00 PM	Lunch	Lunch break.
1:00 PM - 2:30 PM	Project: Simple EDA and Visualization	Work on a dataset to perform exploratory analysis and create visualizations.
2:30 PM - 2:45 PM	Break	Short refreshment break.
2:45 PM - 4:00 PM	Presenting Solutions and Course Wrap-up	Share capstone results, review key takeaways, and discuss next steps.

How to Learn a Programming Language

Adapted Diagram for Learning R



Knuth's Original Diagram



Flow chart for reading this set of books.