RMarkdown Basics — Mini Tutorial

PhD Course — R Programming

2025-11-06

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1 Introduction

Before you start the take-home assignments, it's important to understand what an **RMarkdown** file (`.Rmd`) is and how it works.
RMarkdown is a format that lets you write **text and R code together in one file** — perfect for reproducible reports, analyses, and assignments.

In this short tutorial, you'll learn how to use RMarkdown to create clean, shareable documents that combine your explanations, code, and results.

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2 What is RMarkdown?

RMarkdown is a special type of document that combines:

- **Text**: for explanations, comments, or reflections
- **Code chunks**: where you actually run R commands
- **Output**: results, plots, and tables produced by the code

When you "**knit**" an RMarkdown file, RStudio runs all the code chunks and combines the results with your text to produce a polished report (usually as a **PDF** or **HTML**).

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3 The basic structure of an `.Rmd`

Here's what a minimal RMarkdown document looks like:

````
---
title: "My First RMarkdown"
author: "Student Name"
date: "2025-11-06"
output: html_document
---

# Introduction

This is normal text. You can use **Markdown** formatting for bold, italics, or lists.


```r
# This is R code inside a code chunk
summary(cars)
```

##      speed           dist
##  Min.   : 4.0   Min.   :  2.00
##  1st Qu.:12.0   1st Qu.: 26.00
##  Median :15.0   Median : 36.00
##  Mean   :15.4   Mean   : 42.98
##  3rd Qu.:19.0   3rd Qu.: 56.00
##  Max.   :25.0   Max.   :120.00


When you knit this file, R runs the `summary(cars)` command and includes the results in your output fil

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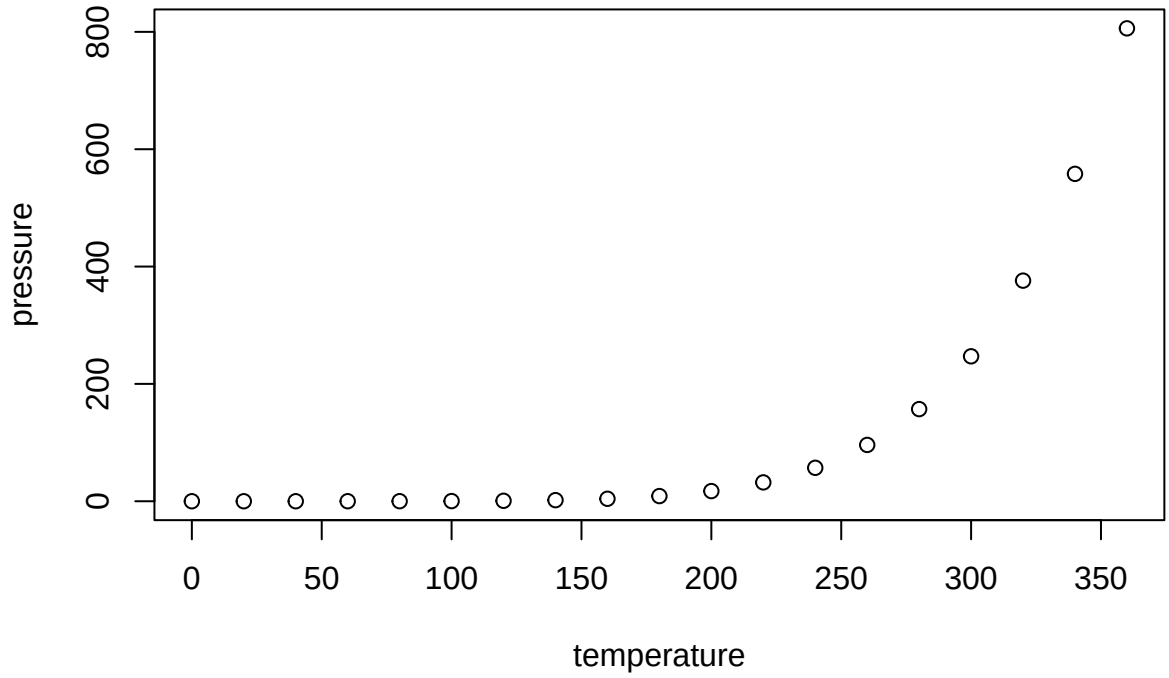
# Code chunks vs. inline code

There are two ways to include code:

1. **Code chunks** - for larger blocks of code:


   ```r
   plot(pressure)
````
````



2. **Inline code** — for short snippets inside text:

   `Today's date is 2025-11-06.`

   When knitted, this will show the actual date.

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4 How to knit in RStudio

1. Open your `.Rmd` file in **RStudio**.
2. At the top, click the **Knit** button.
3. Choose **Knit to HTML** (works on all computers).
   - If you have LaTeX installed, you can also **Knit to PDF**.
4. RStudio will run your R code and create a document that shows text, code, and results together.

   Tip: If knitting fails, try running chunks one by one first using **Ctrl+Shift+Enter** (Windows) or **Cmd+Shift+Enter** (Mac).

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5 Why use RMarkdown?

Using `.Rmd` files has several advantages over plain R scripts:

- You keep your **code, output, and explanations together**.
- You can **recreate your work anytime** — perfect for reproducible science.
- You can share results easily as a **PDF or HTML report**.
- It helps you build good habits for documenting your analysis.

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6 Troubleshooting common issues

Problem	Possible cause	Fix
"Could not find function"	Forgot to load a package	Add `library(package)` at the top
"LaTeX not found"	No LaTeX installed	Knit to HTML instead of PDF
Code chunk errors stop knitting	One chunk failed	Fix the chunk or set `error = TRUE` in its header
Plots missing	Chunk has `echo=TRUE` but not `fig.show='hold'`	Use default settings

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7 Practice task

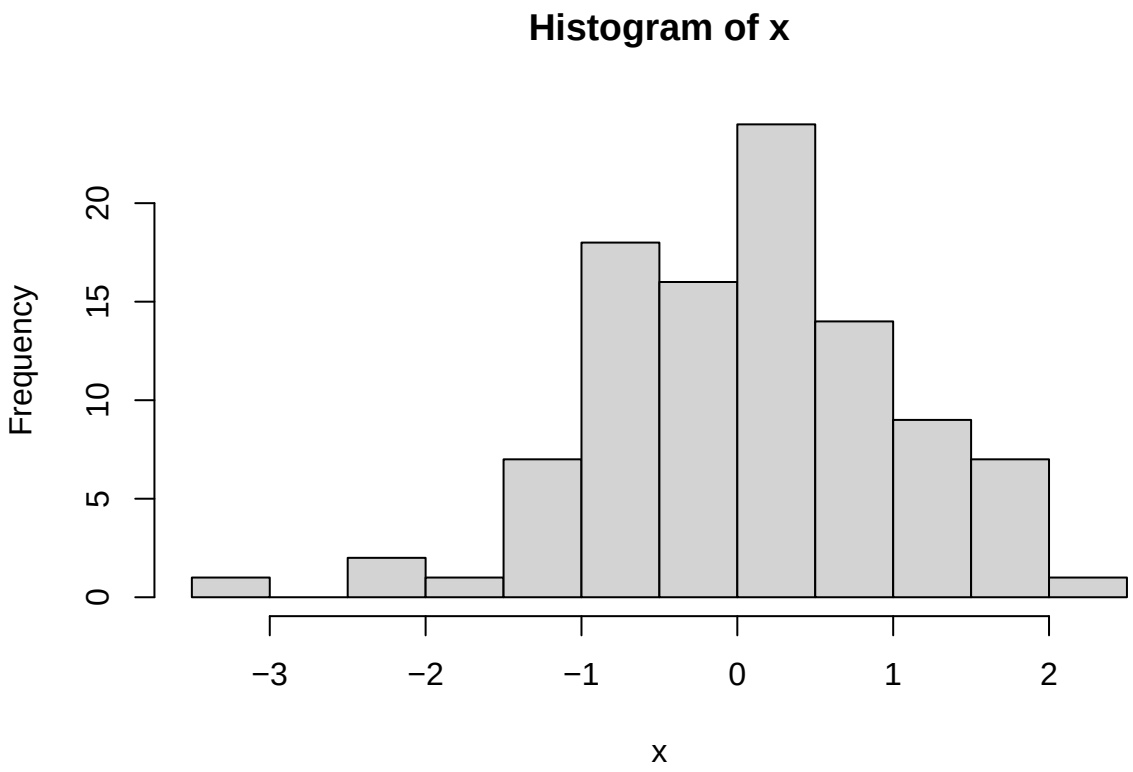
Let's make sure everything works!

Task: Create a new RMarkdown file in RStudio (`File → New File → R Markdown...`)
- Give it a title, your name, and choose HTML output.
- Replace the example code with:

```
x <- rnorm(100)
mean(x)
```

```
## [1] 0.09018081
```

```
hist(x)
```



Then click **Knit**. You should see a short report with your mean value and a histogram.

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8 Final remark

All assignments in this course are provided as `.Rmd` files.
You can fill in the code where the hints are, run chunks, and knit your final work to PDF or HTML.

This short introduction should give you enough to get started — and if you forget something, just come back to this file!