Introduction & overview

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Goals for today

I. Understand the difference between R and R Studio

II. Learn what an R Package is and how to install it

III. Clarify your problems with installing software

R and R-Studio

- R is a programming language
  - It is a language that allows you to issue commands to your computer:

```
> fib_n(4)
```

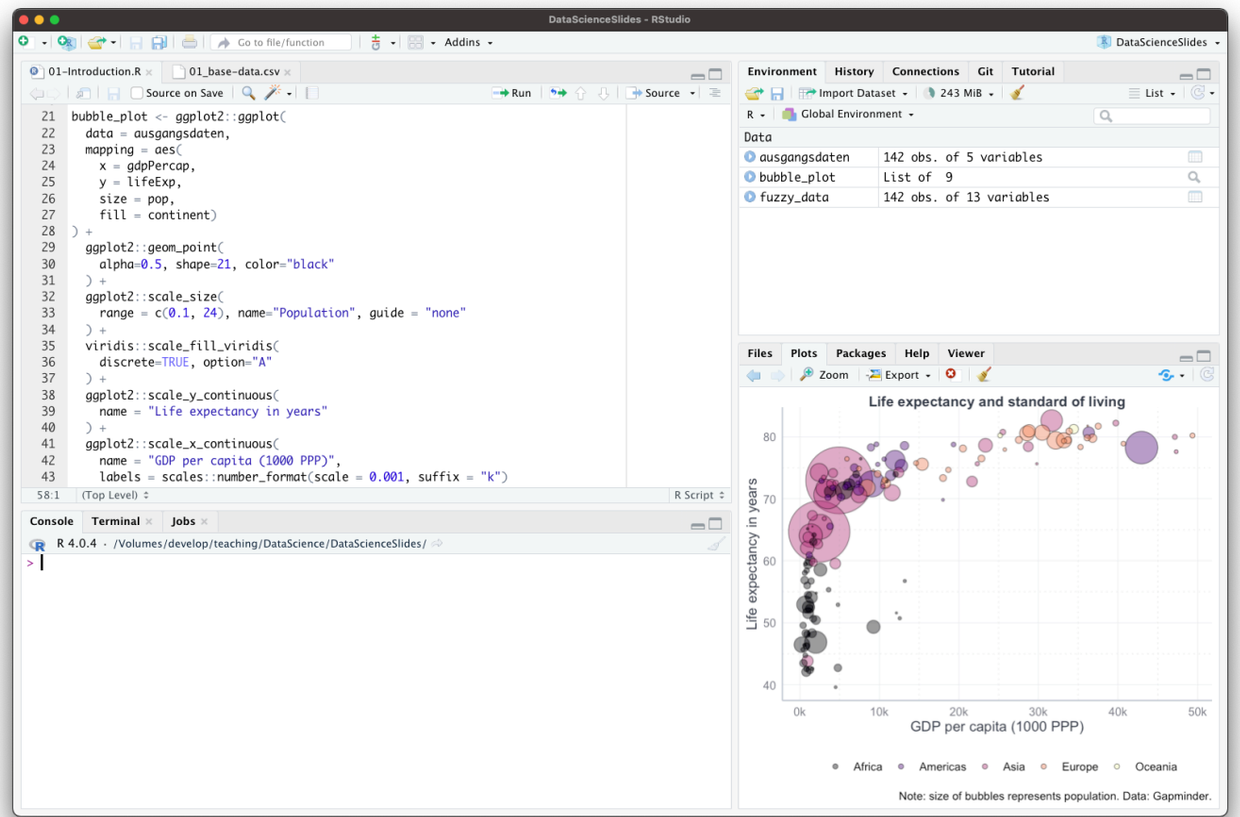


```
8B542408 83FA0077 06B80000 0000C383
FA027706 B8010000 00C353BB 01000000
B9010000 008D0419 83FA0376 078BD989
C14AEBF1 5BC3
```



```
[1] 3
```

- R-Studio is an integrated development environment
  - Basically a fancy text editor with additional features that make programming easy



R and R-Studio

- R is a programming language
- R-Studio is an integrated development environment

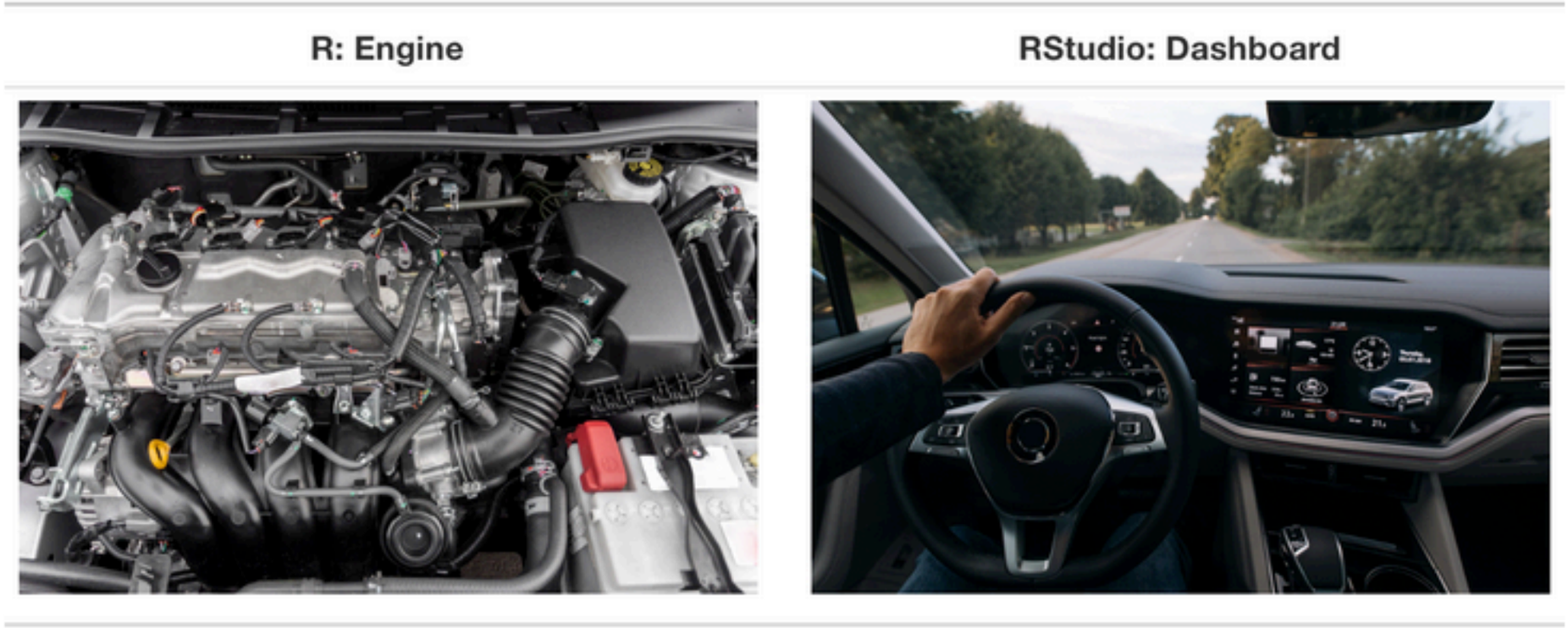


Figure: Ismay & Kim (2022)

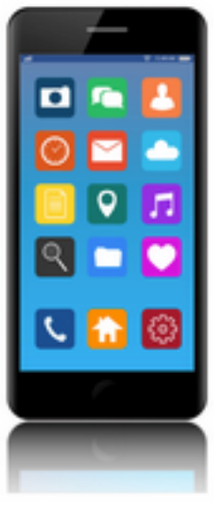
- You need to install R first, then you can install R Studio
- After that, you basically only use R Studio → it calls R whenever necessary

R and R packages

- If you install R, you can issue a lot of commands that your computer immediately understands
- However, there might be some routines that R “doesn’t understand”
- You might “teach” R this by defining, for instance, certain functions that perform these operations
- You might then even “save” these functions and pass it on to others, so that they can use them as well
- This is the idea of **R packages**: a collection of variables and functions written by others that you can install on your computer and use them
- Once an R package is installed, you can use all functions and variables defined by the creator of the package

R and R packages

- Again, Ismay & Kim (2022) have a nice analogy:

R: A new phone	R Packages: Apps you can download
	

- I wrote a small script that installs all packages that we will use throughout the semester, so we can already resolve all installation issues now

And what about LaTeX?

- In this course we learn how to write nice reports in R markdown
  - You put R code and text into one file, and you get a webpage in HTML or a nice PDF file
- Creating HTML code is easy, but creating a PDF is nothing trivial
- To do this, we need a software called LaTeX → a typesetting system
- It turns plain text into nice text within a PDF document

```
---
title: "R Markdown and PDF"
author: "Claudius"
output: pdf_document
---

Here I write text. And add code:

```{r}
sqrt(1:5)
```
```

This is LaTeX

```
\ifLuaTeX
  \usepackage{selnolig}  % disable illegal ligatures
\fi

\title{R Markdown and PDF}
\author{Claudius}
\date{}

\begin{document}
\maketitle

Here I write text. And add code:

\begin{Shaded}
\begin{Highlighting}[]
\FunctionTok{sqrt}\NormalTok{(}\DecValTok{1}\SpecialCharTok{
:}\DecValTok{5}\NormalTok{)}
\end{Highlighting}
\end{Shaded}

\begin{verbatim}
## [1] 1.000000 1.414214 1.732051 2.000000 2.236068
\end{verbatim}
```

R Markdown and PDF

Claudius

Here I write text. And add code:

```
sqrt(1:5)

## [1] 1.000000 1.414214 1.732051 2.000000 2.236068
```

Problems with the installation?