

R Tutorial

What is R and how do I install it?

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Agenda

- What is R?
- How do I install R?
- How do I work with R?
- How can I find help with R?

Software environment R

What is R?

- R is a free software environment for **statistical computing** and **graphics**.
- R was created by **Robert Gentleman** and **Ross Ihaka** in 1993. Since mid-1997, R is developed by the **R Development Core Team** (about 20 people worldwide; many contributors).
- The sources of R (**.tar.gz**) are on <https://cran.r-project.org/> and consist of **base** and **recommended packages** .

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Why R?

- Comes with **tons of functionalities** (plotting, optimization, distribution functions, root-finding, matrix algebra, ...)
- **High-level programming language** with the ability to write readable code.
- Consists of **contributed packages** (both the available ones but also the possibility to write your own)

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How to install R?

Step 1 Install R from <https://cran.r-project.org/>.

Step 2 Install an *integrated development environment (IDE)* (an “editor-application” with cool functionalities):

- RStudio (**recommended**; browser-like):
<http://www.rstudio.com/>
- Others (eg Tinn-R on Windows) can be found online, too!

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How to work with R?

- We create **scripts**, e.g. `myscript.R`, containing the R source code.
- We can run the script **interactively** line-by-line in R-Studio (**recommended**).
- Alternatively, can run the scripts in a terminal with R CMD BATCH `myscript.R` or `Rscript myscript.R`

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How to find help with R?

- **Comprehensive R Archive Network** (<http://cran.r-project.org/>)
 - ▶ Manuals: Click [An Introduction to R](#) (detailed basics) and the FAQ
 - ▶ Task views: Click [here](#) to select packages on certain topics
 - ▶ ...and more
- **Manual pages of packages**
 - ▶ For a specific function, e.g. `pbinom()`, type `?pbinom` or `help("pbinom")`.
⇒ Study the [examples](#) on the [help pages](#)!
- **Google**, **Stackoverflow** or other places in the www. There are few questions that haven't been asked yet!

And that's what it looks like...

console pane

The screenshot shows the RStudio interface with several handwritten annotations in different colors:

- Environment pane (top right):** A pink circle highlights the variable `a` with the value `1`. A pink arrow points from the text "the current (empty) script called 'Untitled1.R'" to this circle. A purple label "stored variables" is written next to the Environment pane.
- Files pane (middle right):** A green circle highlights the file `R: The Binomial Distribution`. A green arrow points from the text "current + help file" to this circle.
- Console pane (bottom left):** A yellow arrow points from the text "assign to variable a the value 1" to the code `a <- 1`. A blue arrow points from the text "help file of 'pbinom()'" to the code `?pbinom`. A yellow arrow points from the text "a simple operation + output" to the output `[1] 2`.

The console output shows the following sequence of commands and results:

```
> ?pbinom
a <- 1
> 1+1
[1] 2
>
```

The help file for `pbinom()` is displayed in the Files pane, showing the description, usage, and arguments for the function.