Common errors and how to fix them

Introduction to R - Day 1

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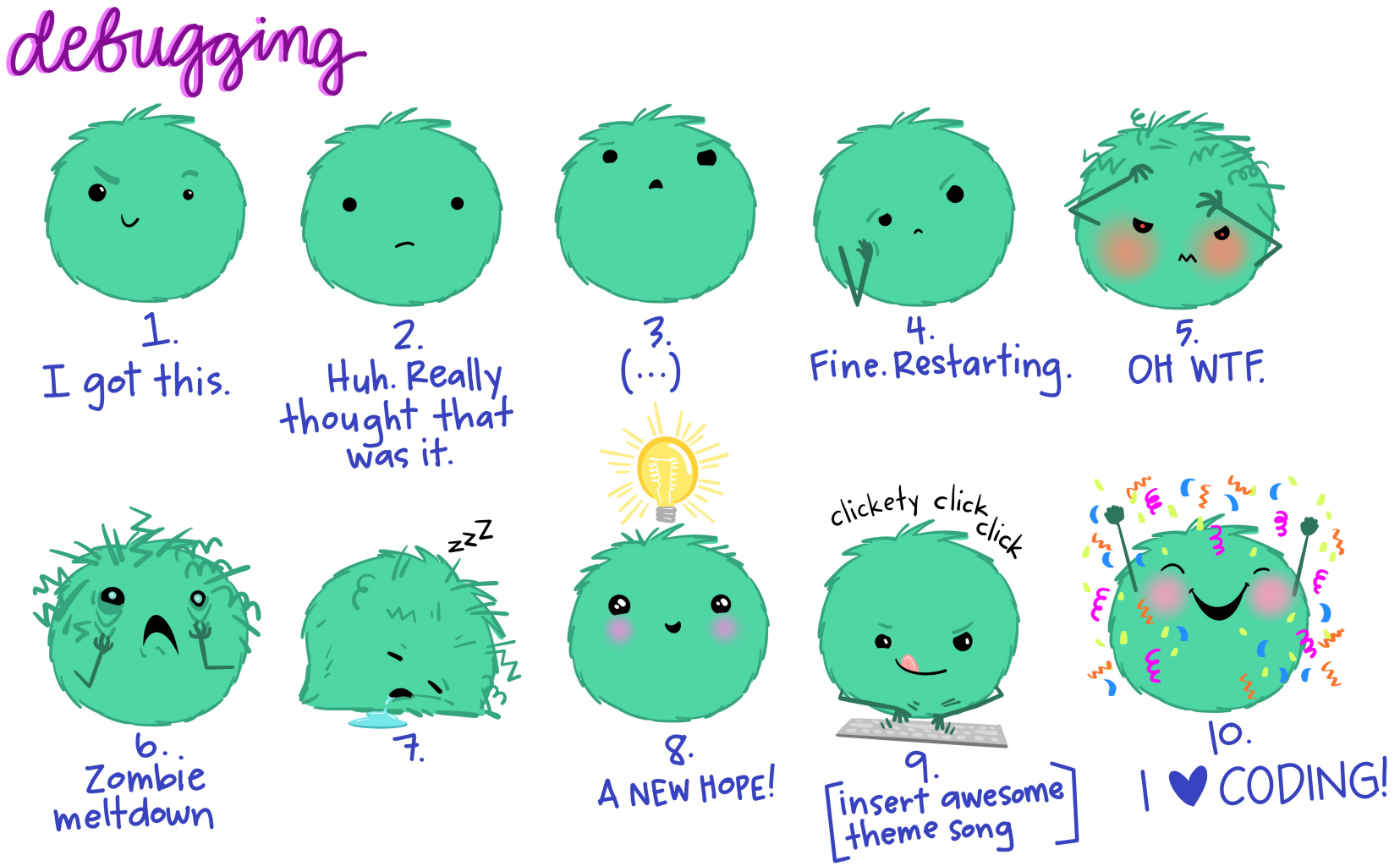
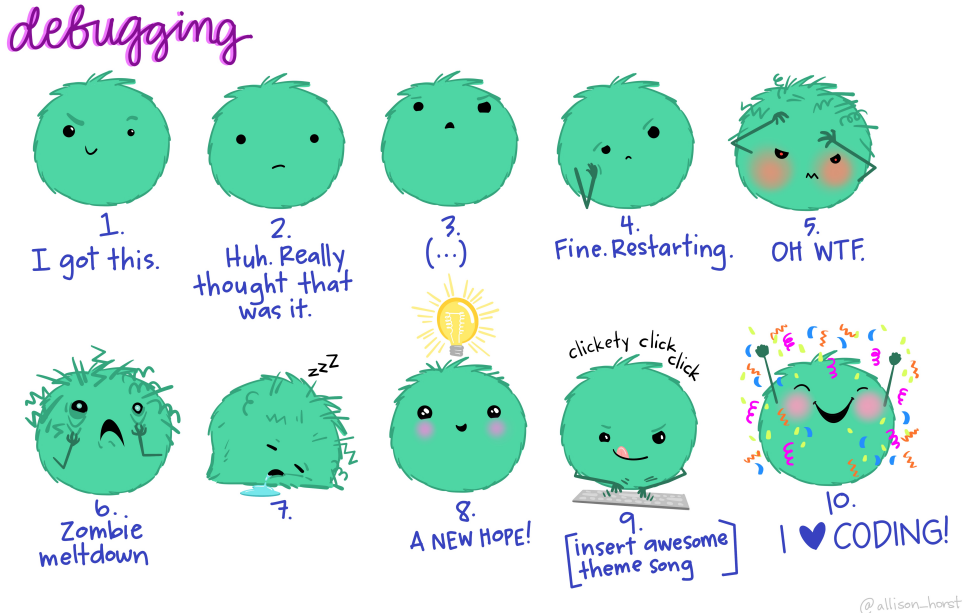
When learning a programming language, you have to be prepared to spend a lot of your time with fixing bugs in the code. So don't worry: It's not you, it's just how programming works!



Debugging

Debugging can be annoying and we can't avoid it, but ...

- ... it's an **effective learning experience** (I actually learned the most from debugging my code)
- ... it will get easier over time
- ... there are some **debugging techniques** to decrease the time in stages 2-7
- ... if nothing helps, there are great people all over the internet willing to help



Most common R errors and problems for beginners and how to deal with them

Syntax errors

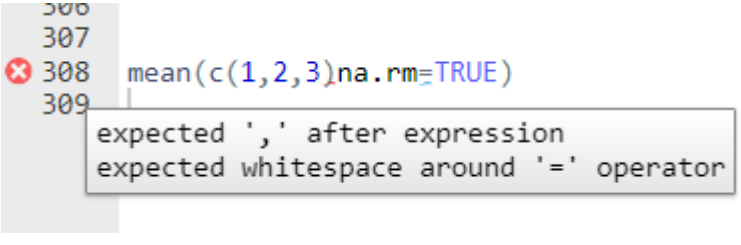
Example

```
mean(c(1,2,3)na.rm=TRUE)
```

```
## Error: <text>:1:14: unexpected symbol
## 1: mean(c(1,2,3)na.rm
##                  ^
```

How to fix

- look for missing commas, misspelled arguments, ...
- read the error message
- the RStudio syntax checker warns you before you run code with syntax errors
  - look for ⊗ next to line numbers in your script



Error: could not find function

Examples

```
##     b  a
## 1   1  1
## 2   2  2
## 3   3  3
## 4   4  4
## 5   5  5
## 6   6  6
## 7   7  7
## 8   8  8
## 9   9  9
## 10 10 10
```

```
## Error in lenght(1:10): could not find function "lenght"
```

How to fix

`Could not find function` errors have two main reasons:

1. You forgot to load the package that the function belongs to

Error: object `x` not found

Example

```
## Error in eval(expr, envir, enclos): object 'hello' not found

## Error in eval(expr, envir, enclos): object 'variable_A' not found
```

How to fix

- you are trying to access an object that does not exist
- Mostly because:
  - typos in variable name (variable name is `variableA` but you try to access `variable_A`)
  - forgot to put quotes around string: `print(hello)` → looks for a variable named hello but instead you wanted to print the string `print("hello")`

Wrong data format

Example

- does not necessarily trigger an error message
- if there is an error message, it can also appear later in your code

How to fix it

- Look at `str()` of your data and check whether all columns are there and in correct format
  - e.g. is a column of type `character` but should be of type `integer`?
- Do that at multiple locations in your script to find the line where the error actually happens
  - everytime you change something in your data, check its structure

R crashes

Sometimes R crashes completely and you see this:

How to fix it

- There is no fix but to start a new session
- Make sure to save your scripts regularly!

Console prints +

R is not running code anymore and the console only prints `+` if you try to execute a command.

How to fix it

- First, go to the console and hit `Escape`. Then you should see the `>` sign instead of `+` again.
- Likely you forgot to close a bracket somewhere. Go to your script and check where this happened
  - look for ⊗ next to line numers

Warnings

R can give you warnings for many reasons, e.g.

- you have `NA` values in your data and try to plot them
- implicit type conversion returned `NA`
- the function you are using is deprecated
- the package you are using was built for another version of R

Warnings are no errors and can sometimes be ignored but:

- make sure to read and understand warnings
- only ignore them if you know that that's okay, otherwise fix the underlying issue

How to troubleshoot R code

A step by step guide

Troubleshoot R: Step by step

Often, you don't need to do all the steps but a systemmatic approach to bug fixing is very helpful.

Step 1: Carefully read the error message and try to fix it

Step 2: Is it any of the errors you learned about just now?

Step 3: If the error is about data or other variables: look at the structure using `str()`

Step 4: If the error is about a function: Read the documentation using `?functionName`.

- Did you use the function correctly?
- Did you forget an argument?

Step 5: Look for answers online

- often you can also jump directly to this step

Step 6: Ask others for help

Step 5: Look for answers online

- Search with keywords **R + package name + Error message/Warning**
- If you don't know how do do something try searching **R + package name + What you want to do**, e.g.
  - "R ggplot change axis title"
  - "R sort vector"
- Usually you can pick any of the top search results, but I recommend results from Stack Overflow
- Always search in English to get more results

💡 Change language of R messages to English with `Sys.setenv(LANGUAGE='en')`

Step 6: Ask others for help

There are plenty of places where you can ask for help online. Some common and good options are:

- Ask a question on Stack Overflow
- Ask in the R Discord server
    - usually fast answers
    - but: you need a Discord account
- Ask on Twitter using the #rstats hashtag (maybe a bit less common)

But: You have to make sure that before, you tried all the other 5 steps.

To ask questions online, you have to learn **how to ask a good R question.** This includes:

- clear question
- reproducible example

Look here for more info on how to ask a good question about R