Advanced R Solutions

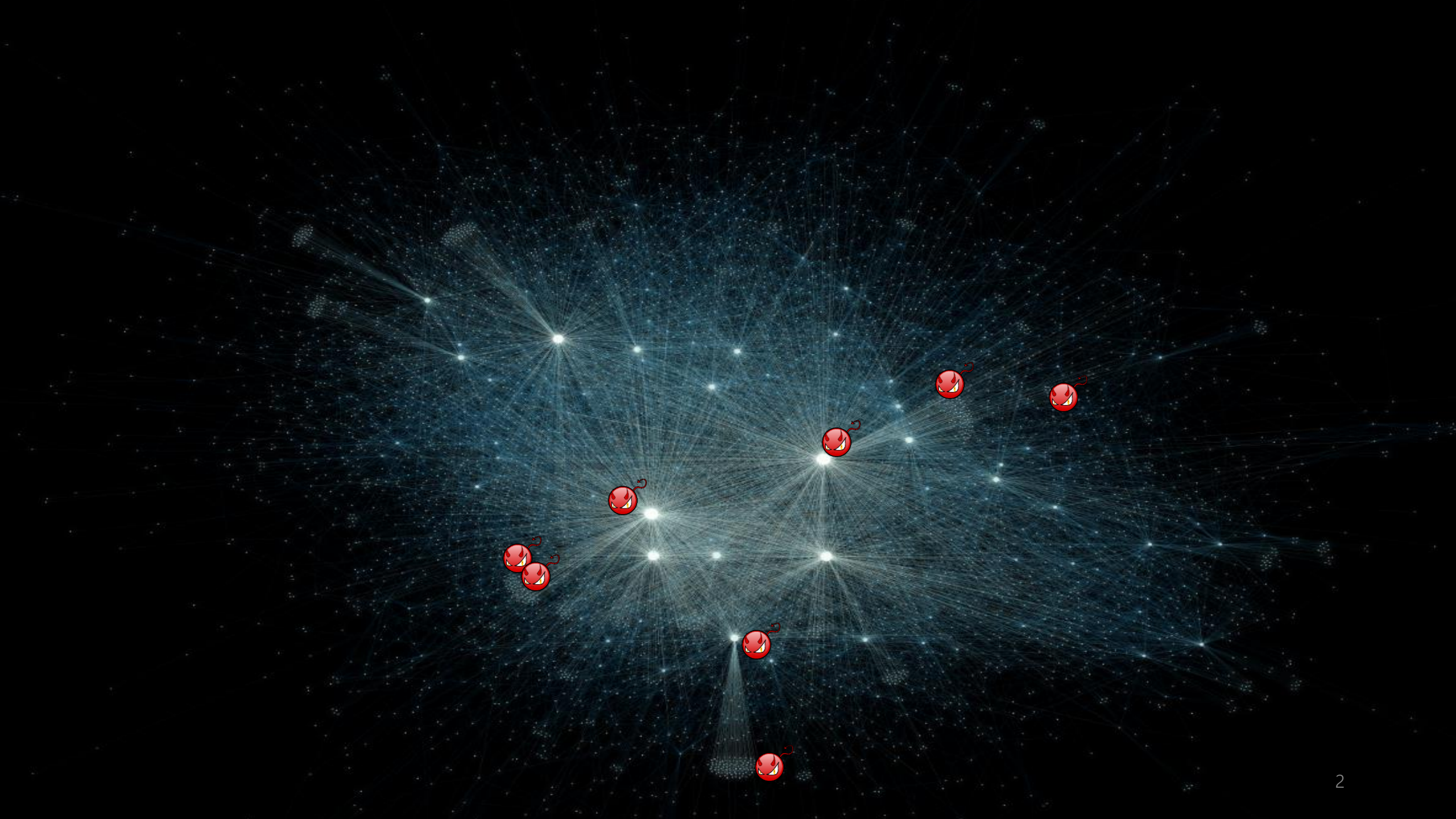
A Bookdown Project

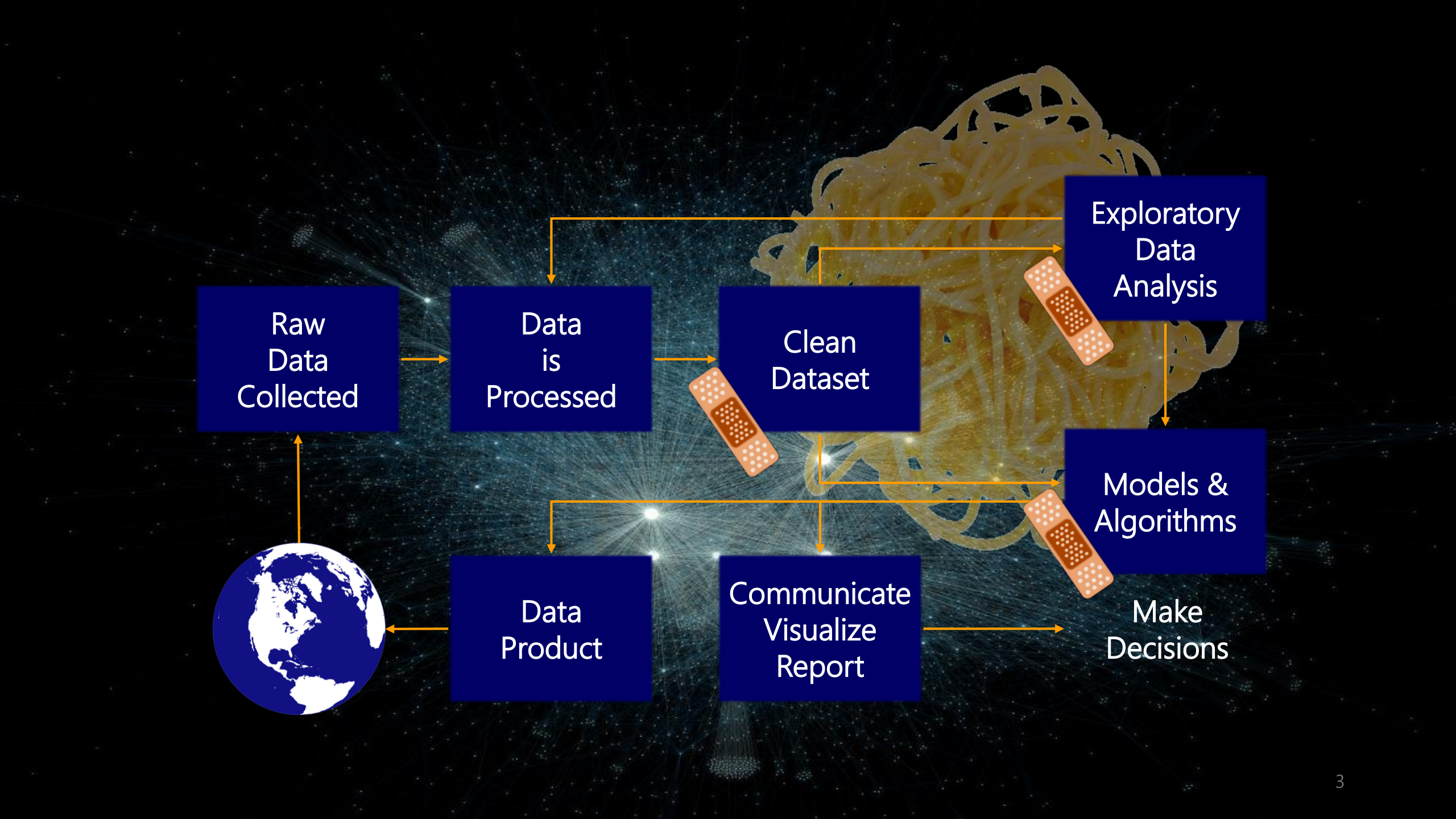
Malte Grosser, Henning Bumann, Peter Hurford & Robert Krzyzanowski

useR!2017 BRUSSELS

R's quirks 

```
> sample(4:4, 5, replace = TRUE)
[1] 4 4 4 4 4
[1] 4 2 4 1 2
```

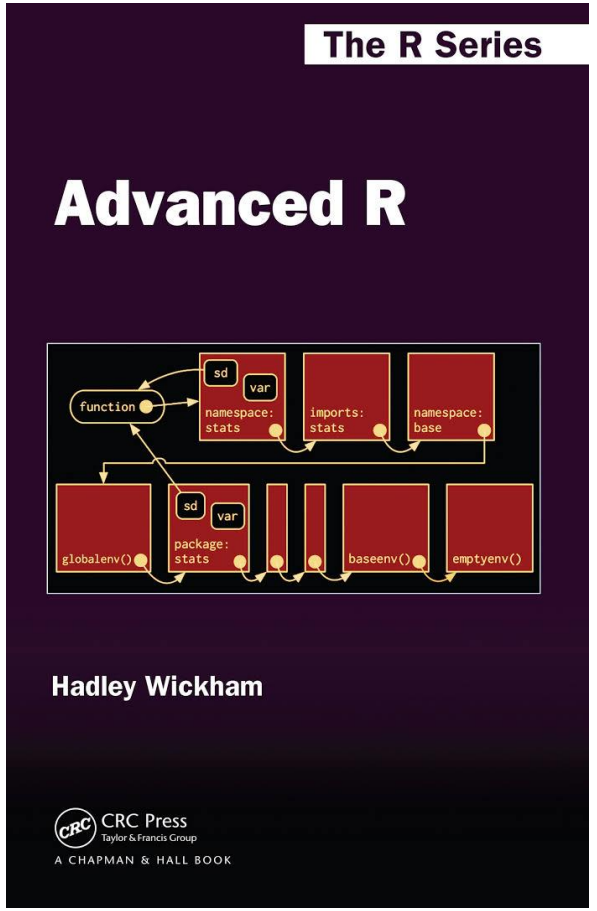



Raw Data Collected
Data is Processed
Clean Dataset
Exploratory Data Analysis
Models & Algorithms
Make Decisions
Communicate Visualize Report
Data Product

Advanced R (Wickham, 2014)

Who should read this book?

- Intermediate R programmers who want to dive deeper into R and learn new strategies for solving diverse problems.
- Programmers from other languages who are learning R and want to understand why R works the way it does.



Challenges

- strong motivation to **understand the content**
- a good memory to **bear all the details in mind**
- discipline to **stay focused** on the content
- patience to **finish**

Exercises

1. Fix each of the following common data frame subsetting errors:

```
mtcars[mtcars$cyl = 4, ]
mtcars[-1:4, ]
mtcars[mtcars$cyl <= 5]
mtcars[mtcars$cyl == 4 | 6, ]
```

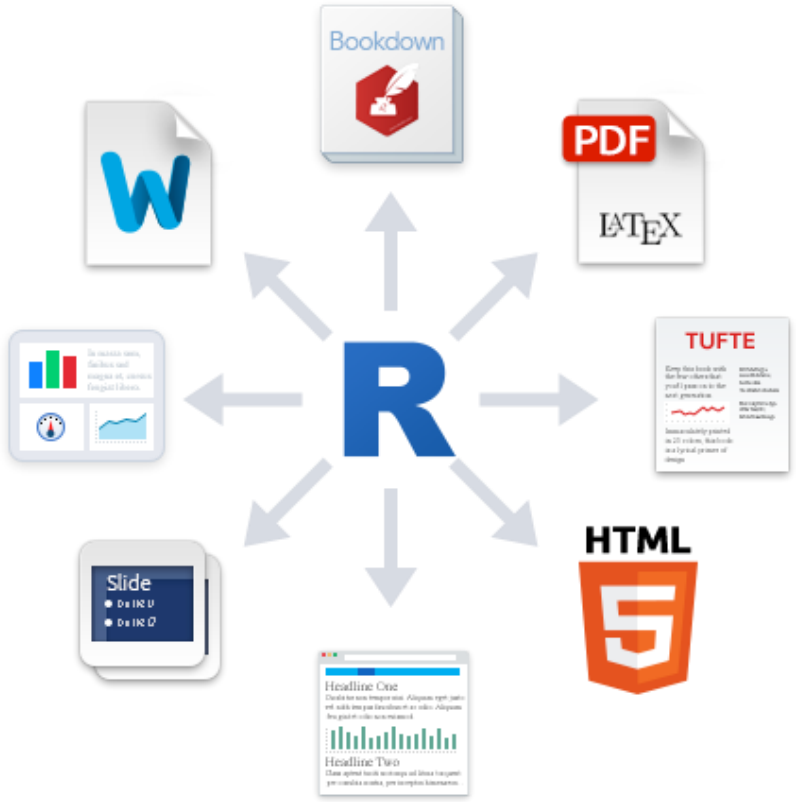
2. Why does `x <- 1:5; x[NA]` yield five missing values? (Hint: why is it different from `x[NA_real_]`?)

3. What does `upper.tri()` return? How does subsetting a matrix with it work? Do we need any additional subsetting rules to describe its behaviour?

```
x <- outer(1:5, 1:5, FUN = "*")
x[upper.tri(x)]
```

R Markdown

- need to **write code anyway**
- solve **every exercise just once**
- possibility to **share** solutions
- **backup** for later



Bookdown to the rescue ;-)

- provides a **good structure**
- almost **no overhead**
- **easy to publish** on bookdown.org (private or public)

Subsetting · Advanced R.

adv-r.had.co.nz/Subsetting.html

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Contents

How to contribute

Edit this page

S3 objects

S3 objects are made up of atomic vectors, arrays, and lists, so you can always pull apart an S3 object using the techniques described above and the knowledge you gain from `str()`.

S4 objects

There are also two additional subsetting operators that are needed for S4 objects: `@` (equivalent to `$`), and `slot()` (equivalent to `[[`). `@` is more restrictive than `$` in that it will return an error if the slot does not exist. These are described in more detail in the OO field guide.

Exercises

1. Fix each of the following common data frame subsetting errors:

```
mtcars[mtcars$cyl = 4, ]
mtcars[-1:4, ]
mtcars[mtcars$cyl <= 5]
mtcars[mtcars$cyl == 4 | 6, ]
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2. Why does `x <- 1:5; x[NA]` yield five missing values? (Hint: why is it different from `x[NA_real_]`?)

3. What does `upper.tri()` return? How does subsetting a matrix with it work? Do we need any additional subsetting rules to describe its behaviour?

```
x <- outer(1:5, 1:5, FUN = "*")
x[upper.tri(x)]
```

4. Why does `mtcars[1:20]` return an error? How does it differ from the similar `mtcars[1:20, ]`?

5. Implement your own function that extracts the diagonal entries from a

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https://bookdown.org/Tazinho/Adva

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2 Subsetting

2.1 Data types

1. **Q**: Fix each of the following common data frame subsetting errors:

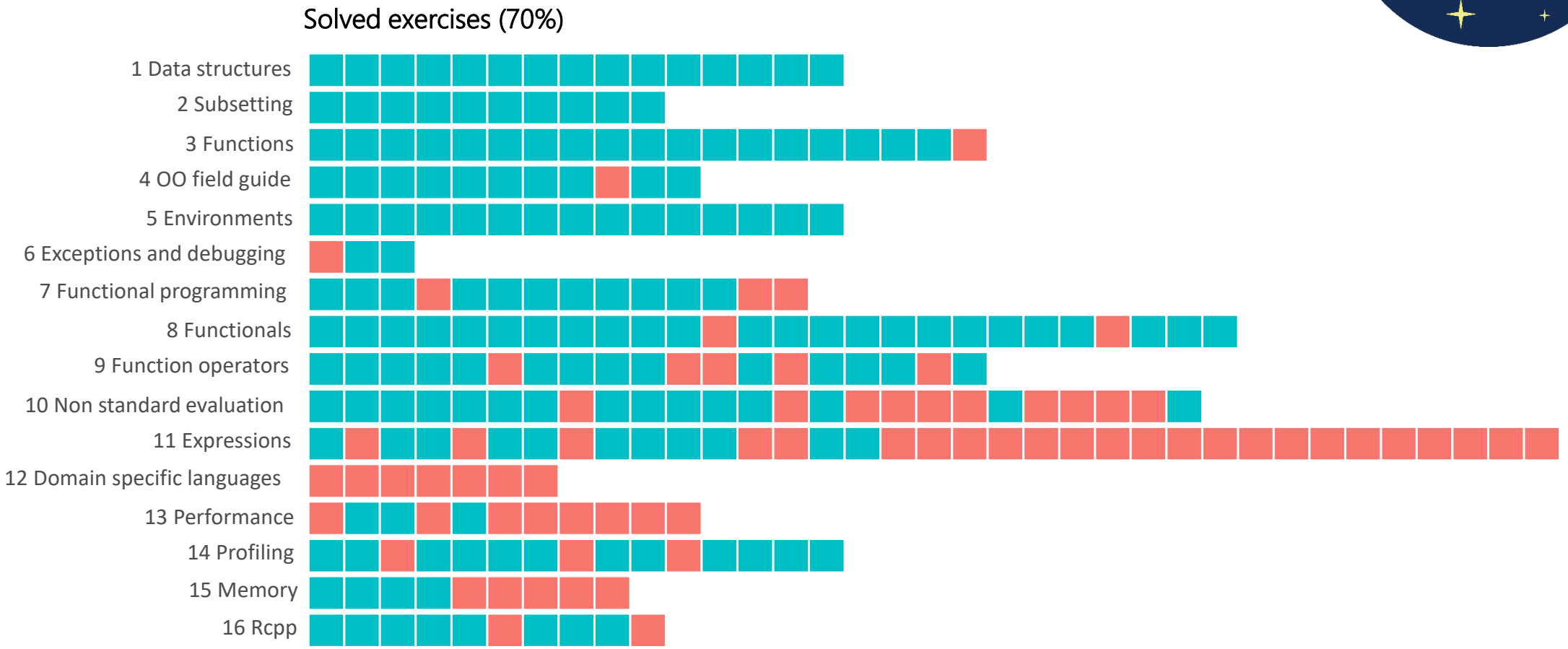
```
mtcars[mtcars$cyl = 4, ]       # = -> ==
mtcars[-1:4, ]                 # -1:4 -> -(1:4)
mtcars[mtcars$cyl <= 5]        # "," is missing
mtcars[mtcars$cyl == 4 | 6, ]  # 6 -> mtcars$cyl == 6
```

2. **Q**: Why does `x <- 1:5; x[NA]` yield five missing values? (Hint: why is it different from `x[NA_real_]` ?)

   A: `NA` is of class logical, so `x[NA]` becomes recycled to `x[NA, NA, NA, NA, NA]`. Since subsetting an atomic with `NA` leads to an `NA`, you will get 5 of them returned. (Note that the recycling won't happen, if you subset with `NA_real_`, `NA_integer`, `NA_character` or `NA_complex`. In fact the latter gives an error).

3. **Q**: What does `upper.tri()` return? How does subsetting a matrix with it work? Do we need any additional subsetting rules to describe its behaviour?

Progress (09/16 – 04/17)



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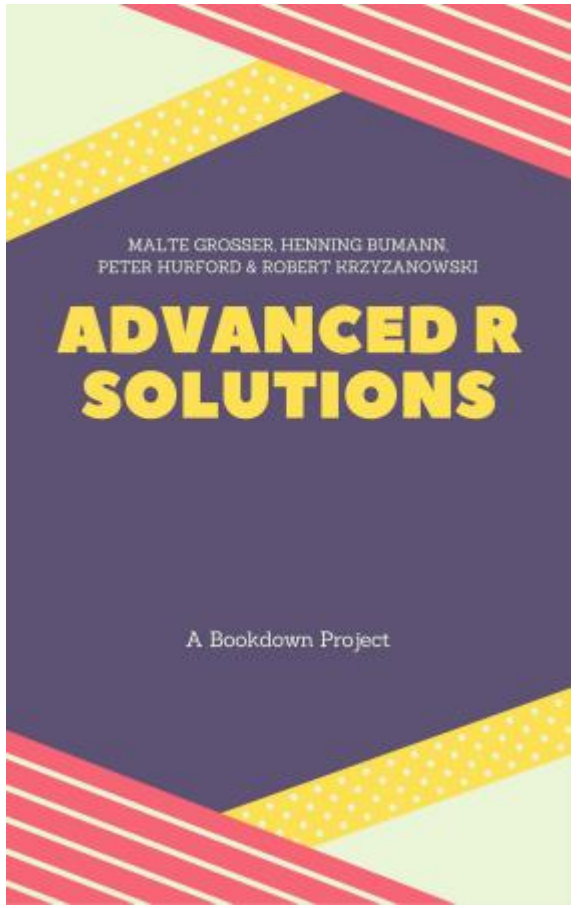
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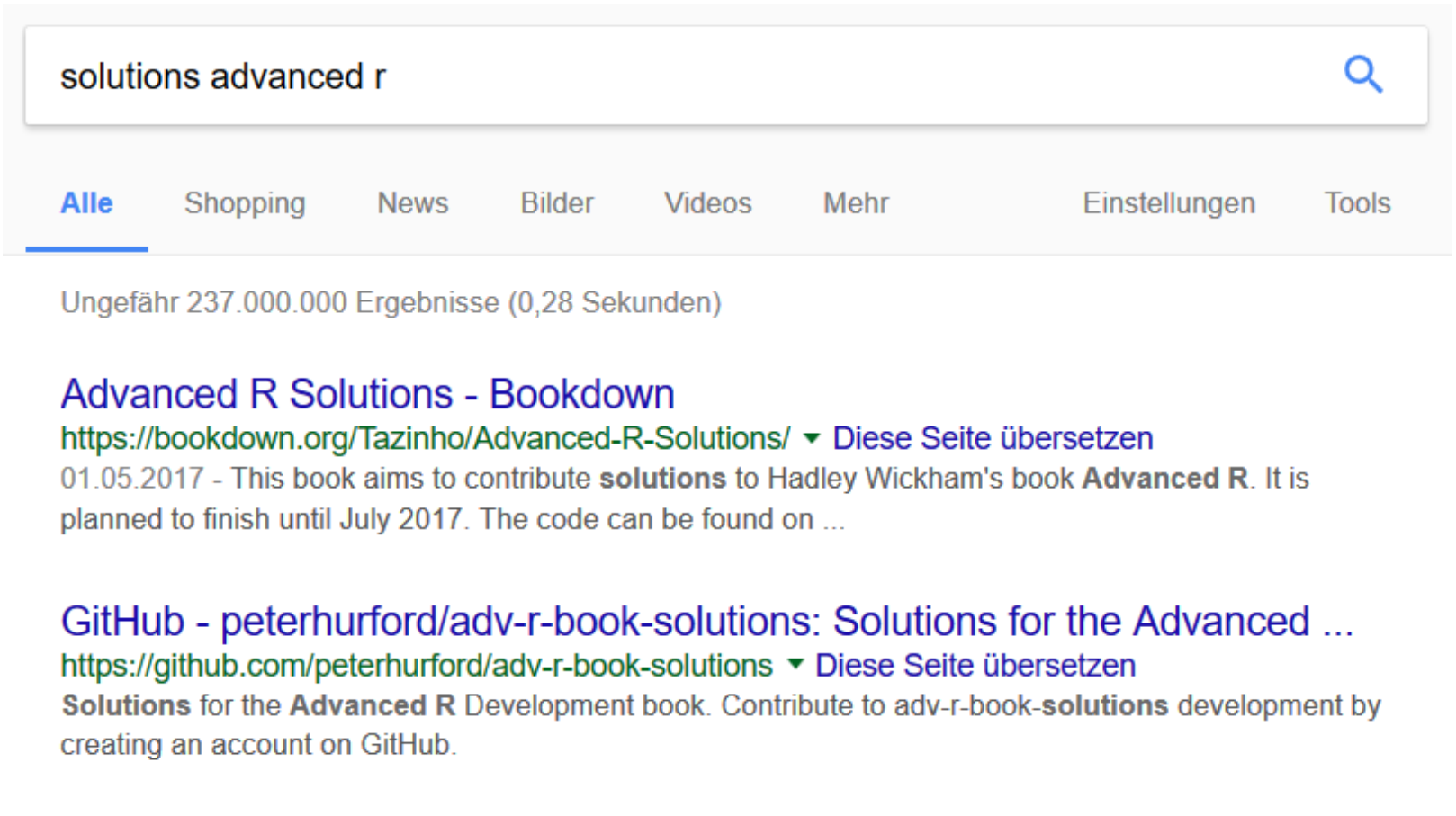
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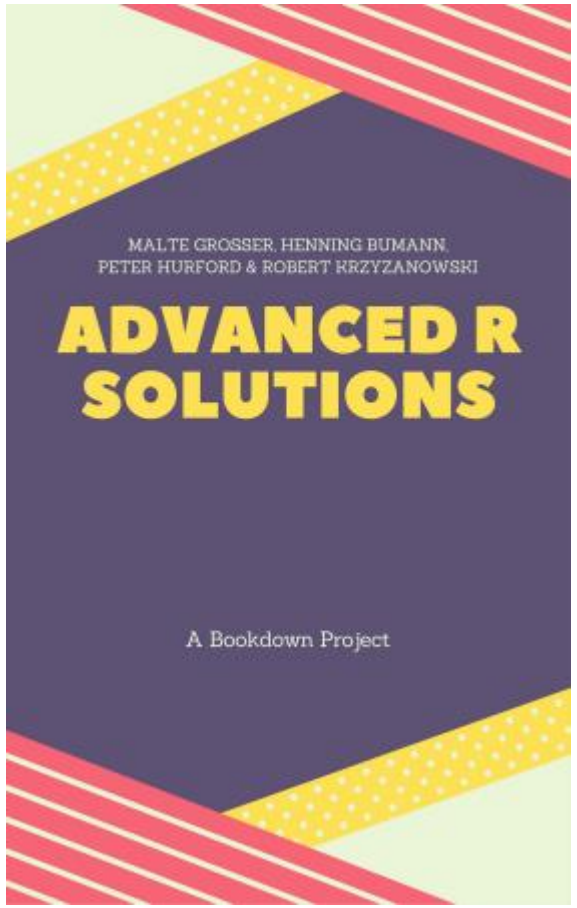
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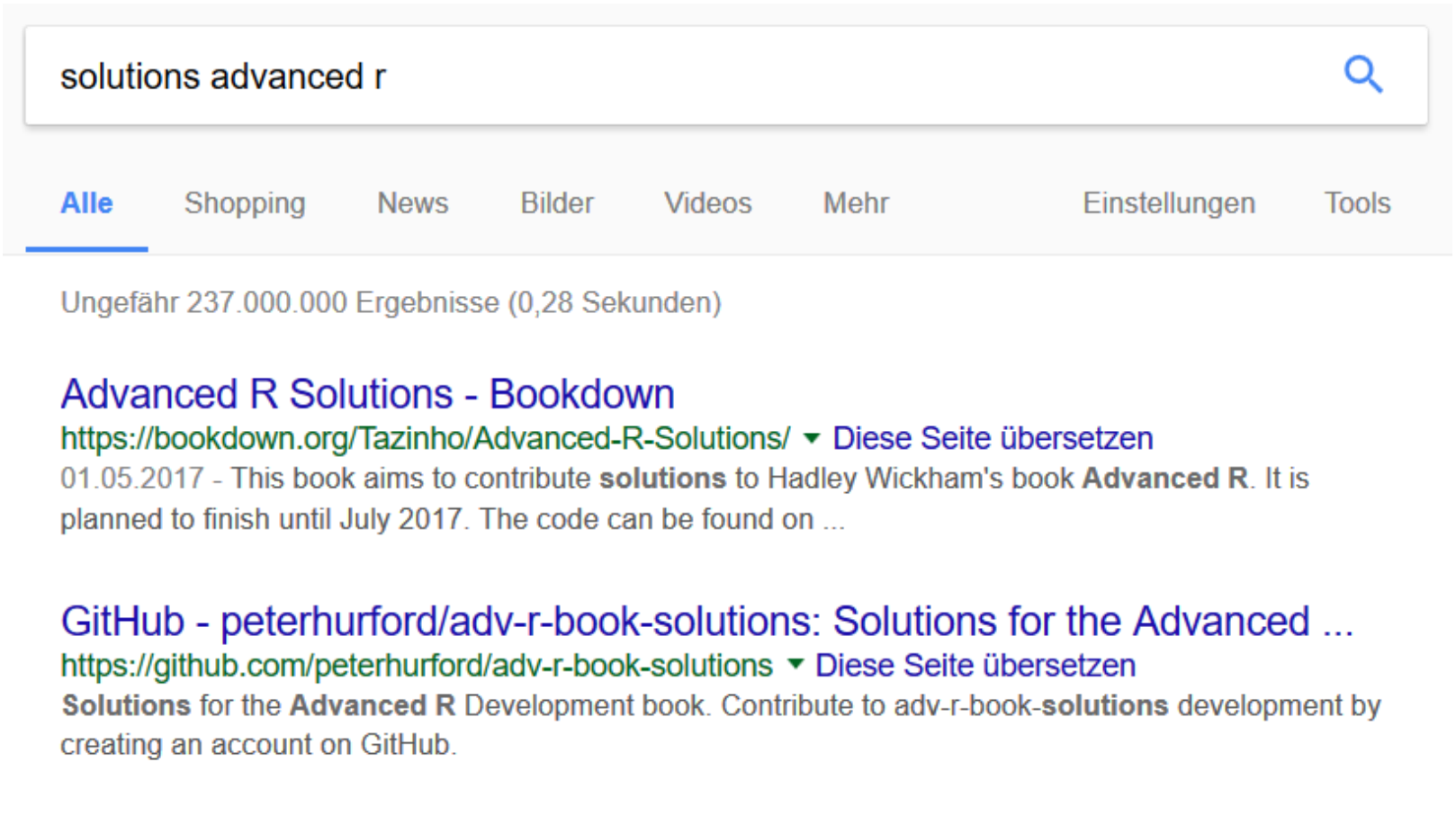
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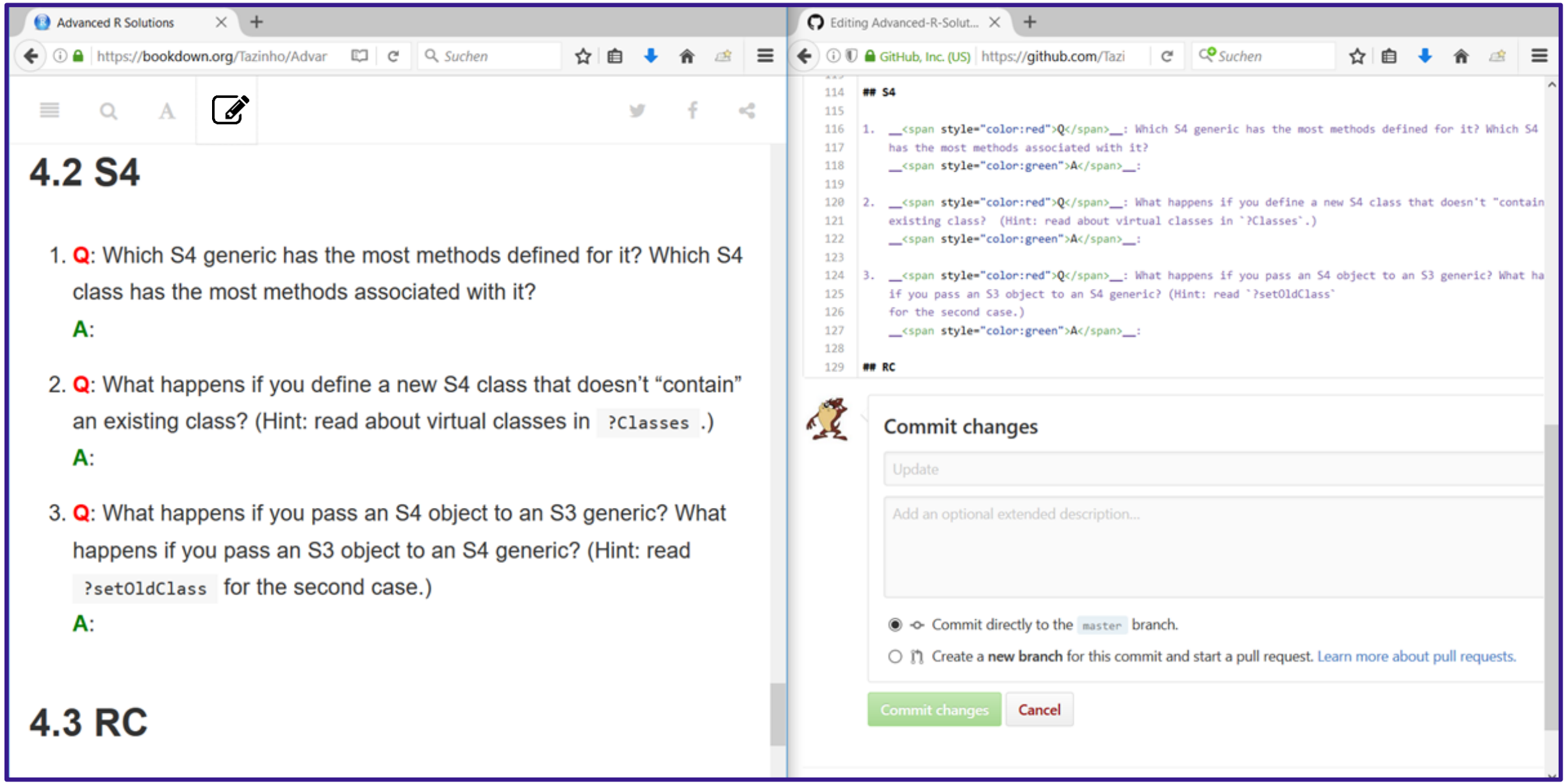
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Suchen
4.2 S4
1. Q: Which S4 generic has the most methods defined for it? Which S4 class has the most methods associated with it?
A:
2. Q: What happens if you define a new S4 class that doesn't "contain" an existing class? (Hint: read about virtual classes in ?Classes .)
A:
3. Q: What happens if you pass an S4 object to an S3 generic? What happens if you pass an S3 object to an S4 generic? (Hint: read ?setOldClass for the second case.)
A:
4.3 RC
Editing Advanced-R-Solut...
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https://github.com/Tazi
Suchen
114 ## S4
116 1. __Q__: Which S4 generic has the most methods defined for it? Which S4 has the most methods associated with it?
118 __A__:
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127 __A__:
129 ## RC
Commit changes
Update
Add an optional extended description...
Commit directly to the master branch.
Create a new branch for this commit and start a pull request. Learn more about pull requests.
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Next steps

Finish the book:

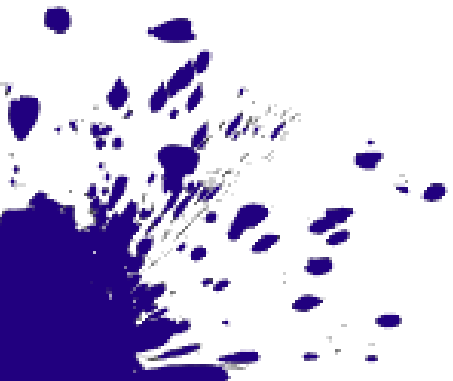
- merge Peter's and Robert's solutions
- solve more exercises
- review & spellcheck

Update with new „Advanced R“ version:

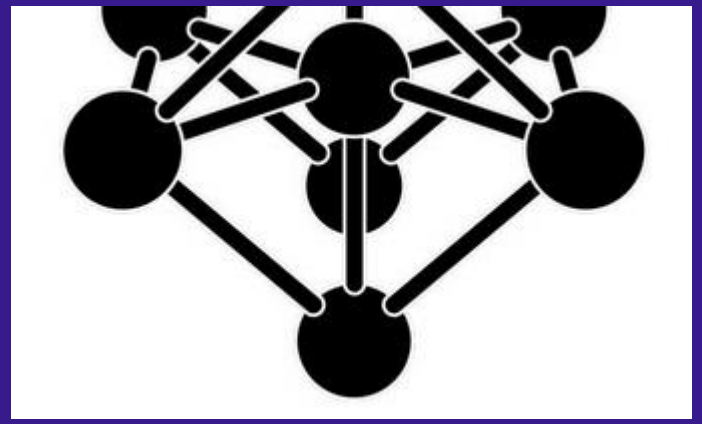
http://adv-r.hadley.nz/

Smaller enhancements:

- toggle option to show/hide answers
- PDF version
- tests



Thank you!



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