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TIB

Accessible

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TIB, 10. July 2018 Recording: doi.org/10.5446/37825
FAIR Data & Software (Carpentries-based workshop) #TIBFDS

Leibniz
Association

Accessibility Agenda

1. **Definitions & roles**

2. Version control & project management with Git(Hub)

3. Lunch

4. “Accessible” software ≈ “comprehensible” code
   - Functions in Python & R

For data to be Accessible

A1. (meta)data are retrievable by their identifier using a standardized communications protocol

- A1.1 the protocol is open, free, and universally implementable
- A1.2 the protocol allows for an authentication and authorization procedure, where necessary

A2. metadata remain accessible, even when the data are no longer available

Your institution's / repository's role

Accessible

- as little access barriers as necessary (user accounts for sensitive data)
- metadata contains contact and responsibility information
- open communication protocols: HTTPS, SFTP, e-mail, SSH, git
  - warning sign: special up-/download tool (justified for large volumes of data)
- offer "tombstone" pages for datasets that had to be deleted
- have exit strategy for (meta)data preservation

Your role as a scientist

Accessible

- access data programmatically whenever possible (web services + R packages & Python modules)
- e-mail requests sometimes necessary & also FAIR (sensitive data)
  - if granted: secure access possible? password manager => unique passwords!
- metadata: can help to plan research (esp. replication)
- request these features from the repositories in your field of study

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for Software to be Accessible

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git Mercurial Subversion

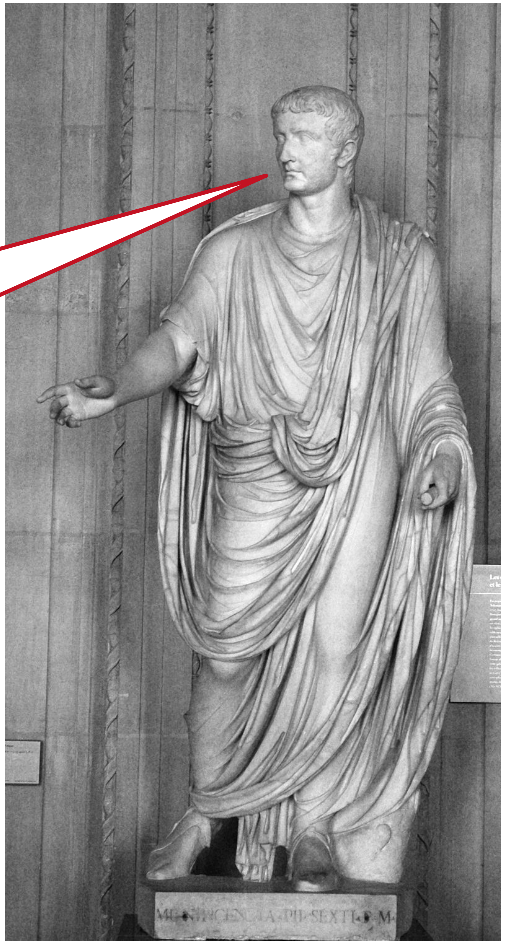
- IDs: commit hashes, repo/project URLs
- GitHub: topics & description

- Microsoft's CodePlex.com & code.Google.com went read-only; GitHub will be bought by MS
- SoftwareHeritage.org as secondary source

Recap from yesterday: GitHub + Zenodo = DOI

- guides.GitHub.com/activities/citable-code
- official integration thanks to science.Mozilla.org/projects/codemeta
- intrinsic IDs (Git’s SHA1 hashes) vs. “minted” PIDs
  - technical vs. procedural persistence
- Zenodo: file backup & persistent landing page for each release version
  - demo: GitHub.com/TIBHannover/BacDiveR/issues/14
- look for “Software Deposit and Preservation Workshop” on

  Software.ac.uk/tags/software-preservation



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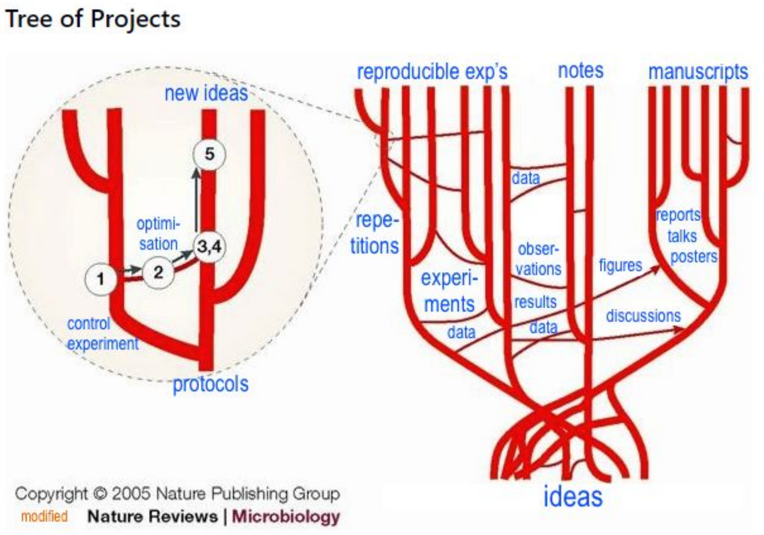
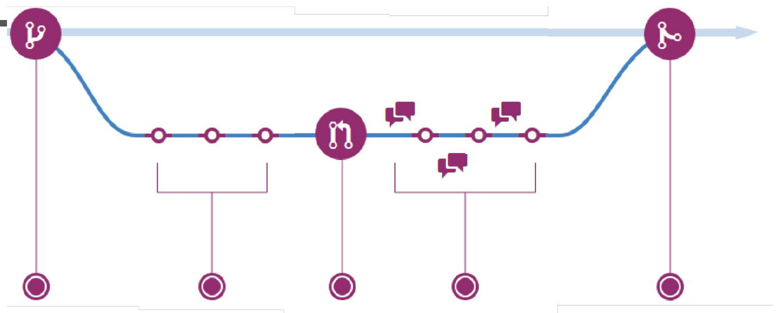
Why version control? Why Git(Hub/Lab)?

1. **VC** because **self-documenting/-explaining** a project’s evolution
2. **Git** because of strongest **network effects**
3. easier **publication** & opportunity for **collaborations**
   a. *“[...] addition of Windows support ... requested for many years [but] ignored ... because none of [us had] experience with Windows. John Cary ... implemented the needed changes ... in just one weekend!” -- Sherry Li (bssw.io)*
   b. BacDiveR *mea culpa*: started privately => “scooped by” BacDive
   c. Pull/Merge Requests = workflow for 21st century => fearless change, smooth review workflow, automation potential
   d. **issue tracker, website hosting, project management, etc.**

   => Git repo as a single source of truth

Leinweber (2018) Einführung in Git(Hub/Lab) av.tib.eu/media/32224

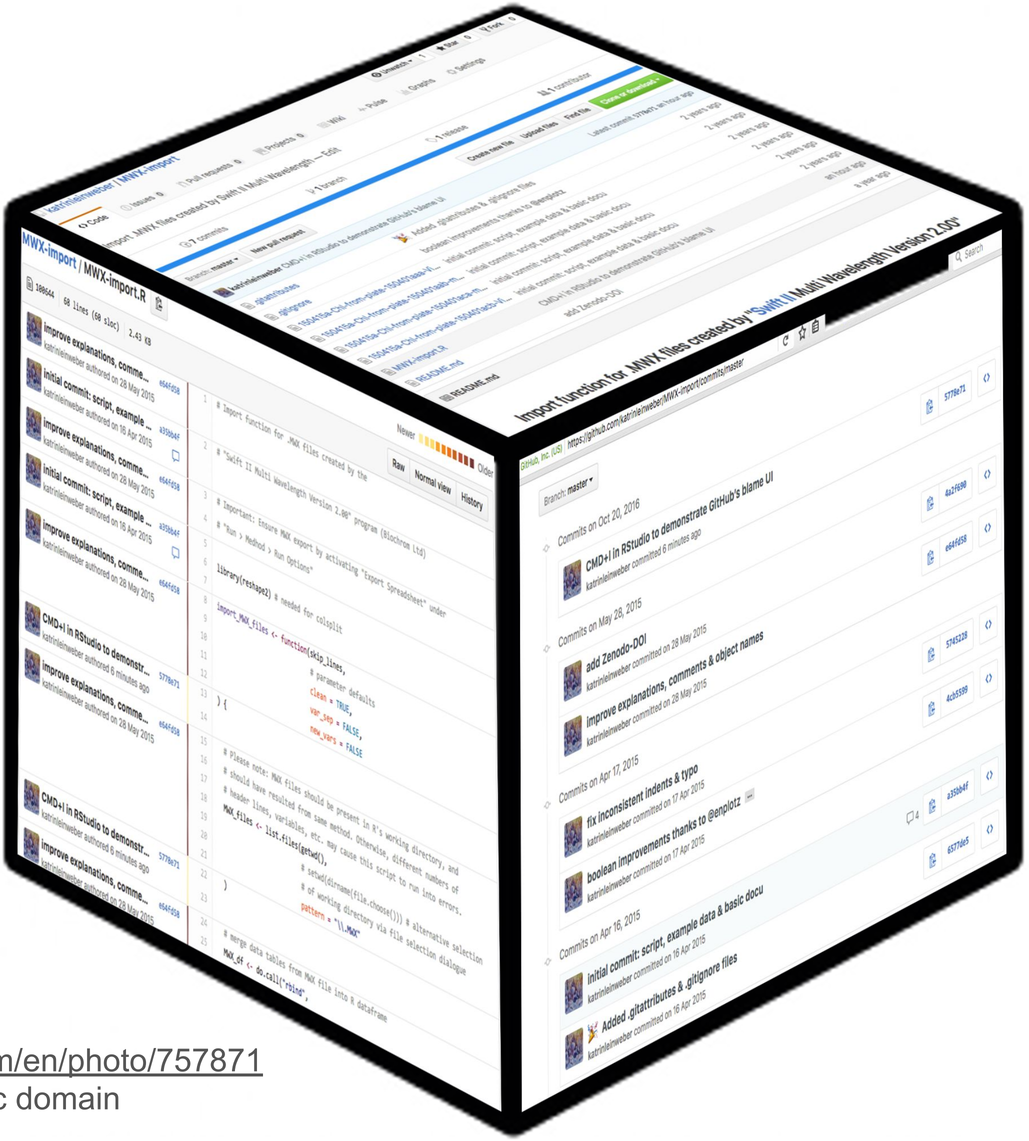




guides.GitHub.com/introduction/flow

Accessing the project’s evolution

- in 3D: normal file/folders, history / `log` & `blame` views
- microscope: `git show ...`
- time-machine: `git checkout ...`



katrinleinweber / MWX-import

Import .MWX files created by Swift II Multi Wavelength — Edit

katrinleinweber CMD+I in RStudio to demonstrate GitHub's blame UI ... Latest commit 5778e71 an hour ago

.gitattributes	Added .gitattributes & .gitignore files	2 years ago
.gitignore	boolean improvements thanks to @enplotz	2 years ago
150415a-Chl-from-plate-150401aaa-Vi...	initial commit: script, example data & basic docu	2 years ago
150415a-Chl-from-plate-150401aab-m...	initial commit: script, example data & basic docu	2 years ago
150415a-Chl-from-plate-150401aca-m...	initial commit: script, example data & basic docu	2 years ago
150415a-Chl-from-plate-150401acb-Vi...	initial commit: script, example data & basic docu	2 years ago
MWX-import.R	CMD+I in RStudio to demonstrate GitHub's blame UI	an hour ago
README.md	add Zenodo-DOI	a year ago

README.md

MWX-import / MWX-import.R

100644 | 68 lines (60 sloc) | 2.43 KB

improve explanations, comme... katrinleinweber authored on 28 May 2015	e64fd58
initial commit: script, example ... katrinleinweber authored on 16 Apr 2015	a35bb4f
improve explanations, comme... katrinleinweber authored on 28 May 2015	e64fd58
initial commit: script, example ... katrinleinweber authored on 16 Apr 2015	a35bb4f
improve explanations, comme... katrinleinweber authored on 28 May 2015	e64fd58
CMD+I in RStudio to demonstr... katrinleinweber authored 6 minutes ago	5778e71
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CMD+I in RStudio to demonstr... katrinleinweber authored 6 minutes ago	5778e71
improve explanations, comme... katrinleinweber authored on 28 May 2015	e64fd58

```
# Import function for .MWX files created by the
# "Swift II Multi Wavelength Version 2.00" program (Biochrom Ltd)
# Important: Ensure MWX export by activating "Export Spreadsheet" under
# "Run > Medhod > Run Options"

library(reshape2) # needed for colsplit

import_MWX_files <- function(skip_lines,
                             # parameter defaults
                             clean = TRUE,
                             var_sep = FALSE,
                             new_vars = FALSE
) {

  # Please note: MWX files should be present in R's working directory, and
  # should have resulted from same method. Otherwise, different numbers of
  # header lines, variables, etc. may cause this script to run into errors.
  MWX_files <- list.files(getwd(),
                          # setwd(dirname(file.choose())) # alternative selection
                          # of working directory via file selection dialogue
                          pattern = "\\.MWX"
  )

  # merge data tables from MWX file into R dataframe
  MWX_df <- do.call("rbind",
```

Import function for .MWX files created by "Swift II Multi Wavelength Version 2.00"

GitHub, Inc. (US) https://github.com/katrinleinweber/MWX-import/commits/master

Commits on Oct 20, 2016

CMD+I in RStudio to demonstrate GitHub's blame UI katrinleinweber committed 6 minutes ago	5778e71

Commits on May 28, 2015

add Zenodo-DOI katrinleinweber committed on 28 May 2015	4a2f690
improve explanations, comments & object names katrinleinweber committed on 28 May 2015	e64fd58

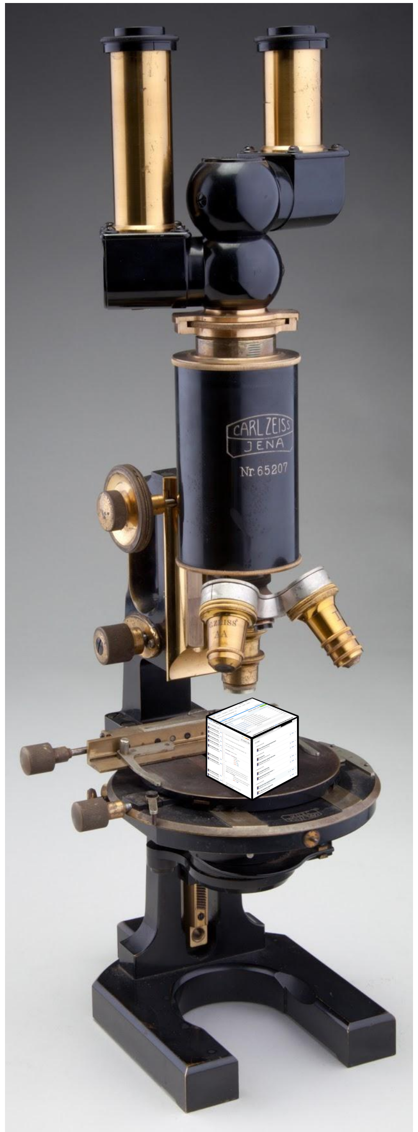
Commits on Apr 17, 2015

fix inconsistent indents & typo katrinleinweber committed on 17 Apr 2015	5745228
boolean improvements thanks to @enplotz ... katrinleinweber committed on 17 Apr 2015	4cb5599

Commits on Apr 16, 2015

initial commit: script, example data & basic docu katrinleinweber committed on 16 Apr 2015	a35bb4f
Added .gitattributes & .gitignore files katrinleinweber committed on 16 Apr 2015	6577de5

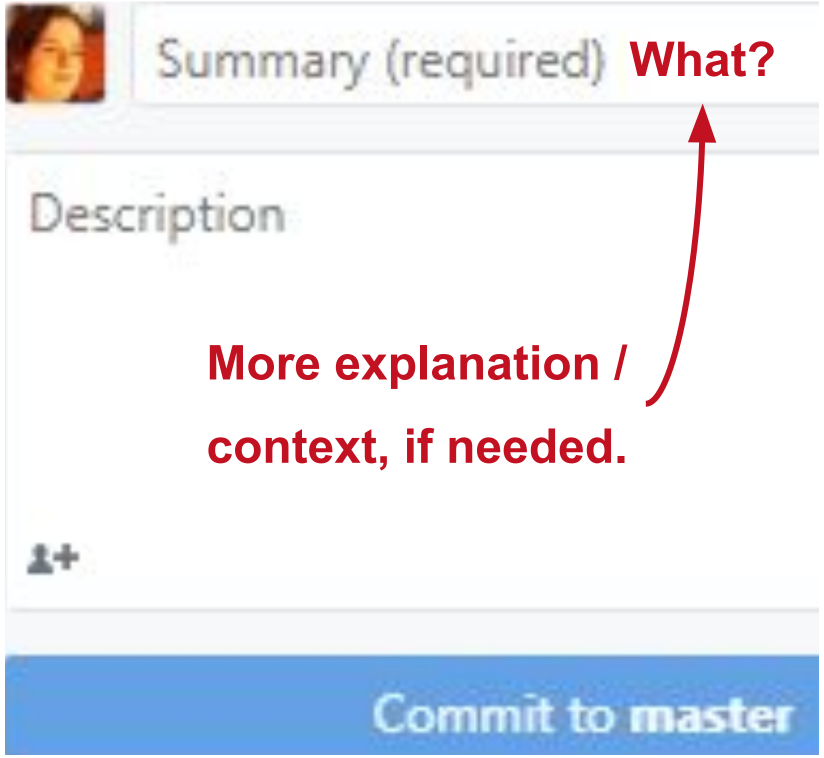
pxhere.com/en/photo/757871
CC0 Public domain



By Chad Anderson, staff photographer for SFO Museum CC BY-SA 2.0
via commons.Wikimedia.org/w/index.php?curid=45625745 (cropped)

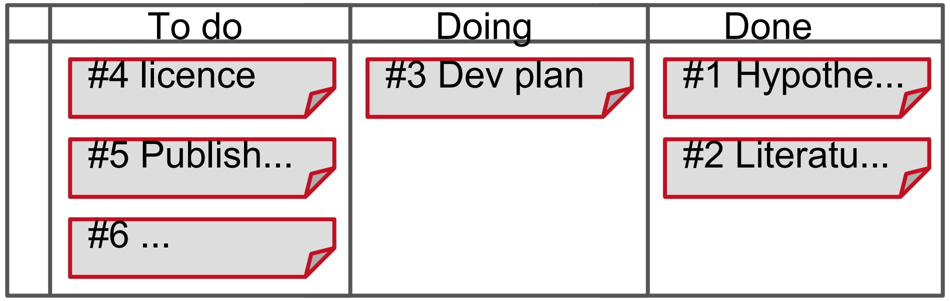
Accessible for your future self, collaborators, students, reviewers

- commit messages should explain answer mostly the “Why?”
  - explanations besides history / `log` & `blame` view
  - demo: [GitHub.com/TIBHannover/BacDiveR/commits]() & [/blame/master/R/aggregate_datasets.R]()
  - pull/merge request titles can answer only the “What?”
- diffs should be small, logical, atomic, also across many files
  - fixing typos & links => `git commit -m “Proof-read”`
  - code & test => `git commit -m “Implement feature ...”`



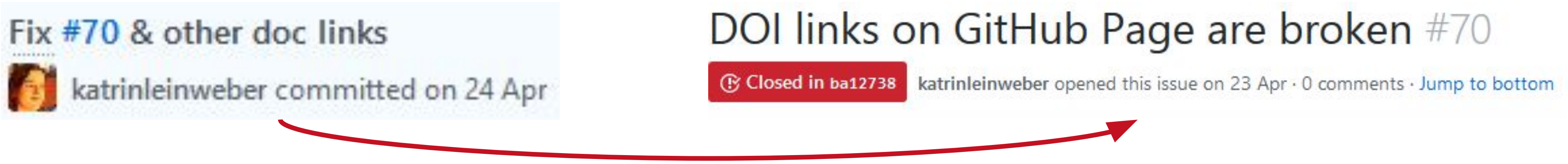
Git is both a communication channel when necessary, and a communication-avoidance system when not.

Issue tracking = project management



To do	Doing	Done
#4 licence	#3 Dev plan	#1 Hypothe...
#5 Publish...		#2 Literatu...
#6 ...		

- issue = idea, discussion, problem report, question, etc.
- `- [ ] task` lists, `@`-mentions, `#`-links to other issues
- labels, assignees, milestones / due dates, etc.
- (peer-)reviewing pull/merge request = knowledge transfer within team
- “closing keywords” on most Git platforms: `fix #...` in commit message



Fix #70 & other doc links

katrinleinweber committed on 24 Apr

DOI links on GitHub Page are broken #70

katrinleinweber opened this issue on 23 Apr · 0 comments · Jump to bottom

issue tracker = “living plan”, community workspace, discussion forum, work sheet, etc.

Version control beyond software source code

Tenen & Wythoff (2014)
ProgrammingHistorian.org/en/lessons/sustainable-authorship-in-plain-text-using-pandoc-and-markdown

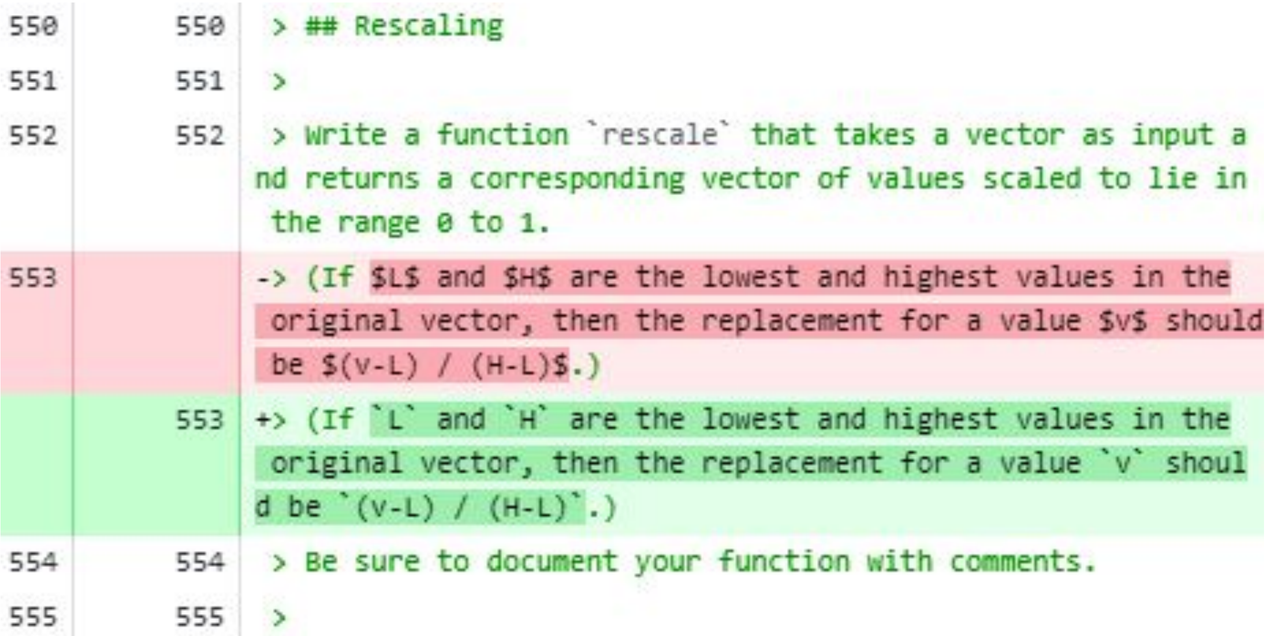
- large, non-text files => Git-LFS.com
- text documents: Markdown, LaTeX, GitHub/Lab Pages
  - alternative to fast-syncing tools like GDoc, EtherPad, HackMD, etc.
  - only problem: keeping diffs small & readable => break lines after N characters
  - up & coming tools: Overleaf.com

    GitBook.com

    Authorea.com

    PenFlip.com

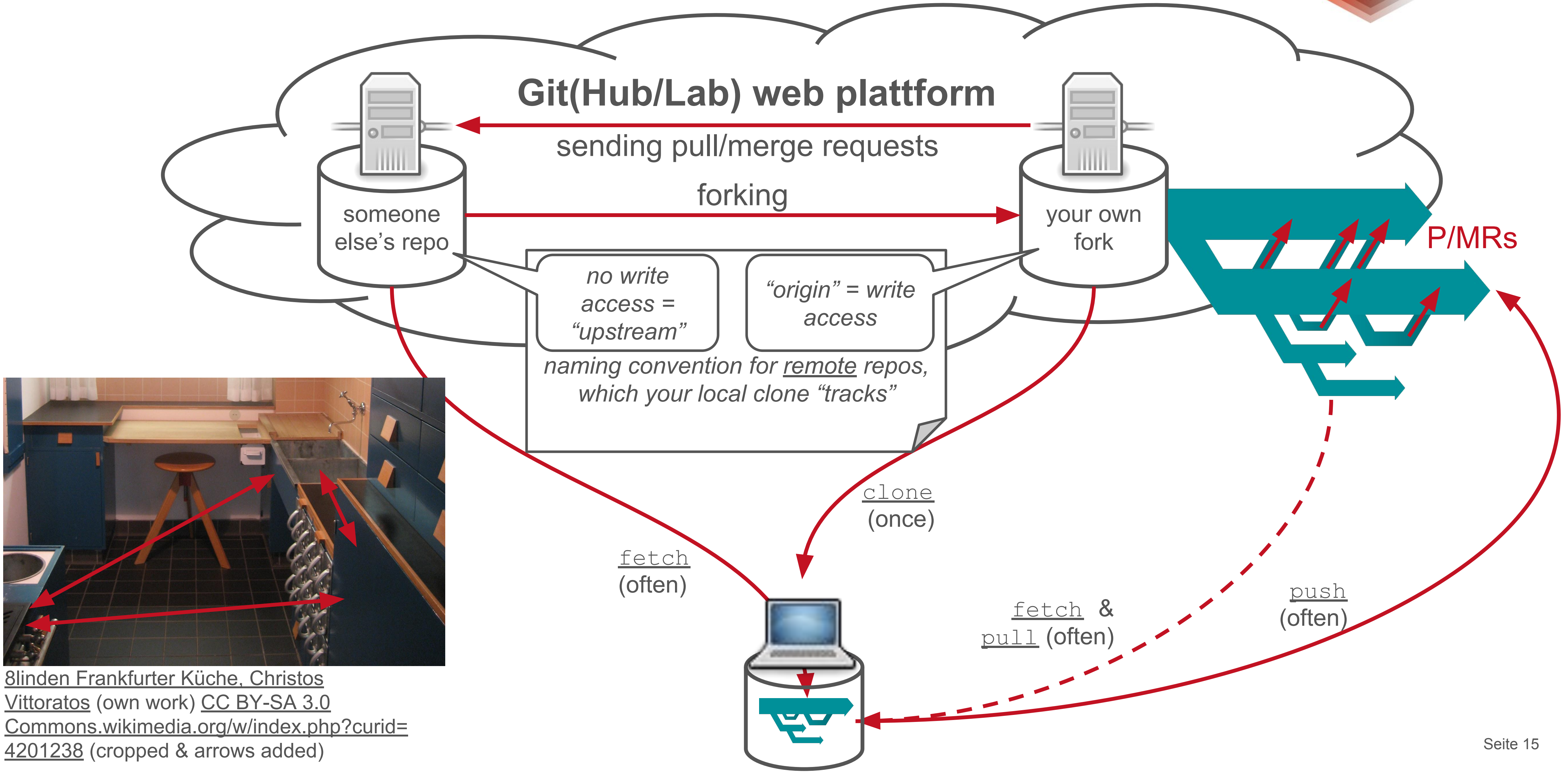
Bundes-Git@ec6a9c3d#diff-5eaf7301...L595



```
> ## Rescaling
>
> Write a function `rescale` that takes a vector as input a
nd returns a corresponding vector of values scaled to lie in
 the range 0 to 1.
-> (If $L$ and $H$ are the lowest and highest values in the
 original vector, then the replacement for a value $v$ should
 be $(v-L) / (H-L)$.)
+> (If `L` and `H` are the lowest and highest values in the
 original vector, then the replacement for a value `v` shoul
d be `(v-L) / (H-L)`.)
> Be sure to document your function with comments.
>
```

Git workflows (correct typos/links in WUI & CLI)

Git workflow



Git(Hub/Lab) web plattform

sending pull/merge requests

forking

someone else's repo

your own fork

P/MRs

no write access = "upstream"

"origin" = write access

naming convention for <u>remote</u> repos, which your local clone "tracks"

`clone` (once)

`fetch` (often)

`fetch` & `pull` (often)

`push` (often)

8linden Frankfurter Küche, Christos Vittoratos (own work) CC BY-SA 3.0 Commons.wikimedia.org/w/index.php?curid=4201238 (cropped & arrows added)

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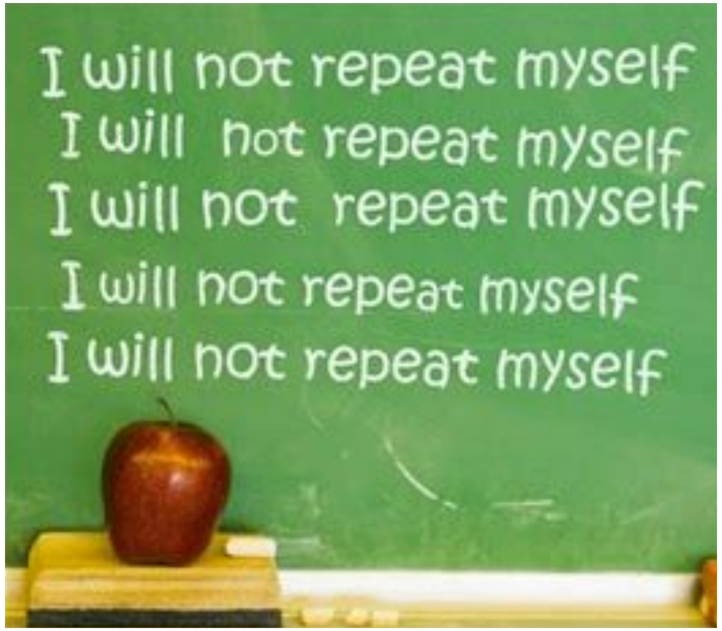
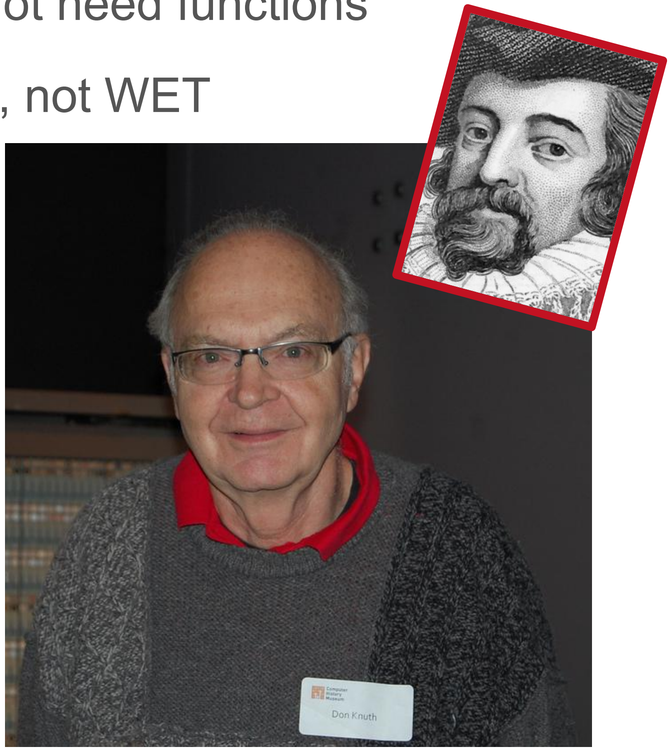
iterative, continuous improvement

Functions ("subroutines" or "procedures")



- scripts without code duplication may not need functions
- but instead of copy-pasting: stay DRY, not WET
  en.Wikipedia.org/?curid=3291957
- code is a liability / technical debt

> *"Programs are meant to be read by humans and only incidentally for computers to execute."*



Donald Knuth (inventor of TeX)
flickr.com/vonguard (cropped; CC-BY-SA-2.0)

- concise function names are the beginning of good documentation
- individual & automatic "unit testing"
- Python:
  GitHub.com/TIBHannover/2018-07-09-FAIR-Data-and-Software/tree/gh-pages/code/Python &
  KatyHuff.GitHub.io/python-testing

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Which questions do you have for us?

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Leibniz Association