

# Git 1

Modern cpp Programming & Missing session

# Contents

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- Version Control System
- Git
- Github
- Open source
- Simple tutorial

# Version Control System (VCS)

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- Imagine you're a writer...
  - while writing a book, various problems / situations can occur
    - Someone burned your draft
    - The writing went off at a tangent
    - Someone made feedback for you
    - You should collaborate with others
  - To manage / keep your writing safe, you need...
    - backup
    - log
    - platform to work / communicate with other authors
    - and else...

# Version Control System

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- Same problems can occur in *programming!*
- Imagine such situations...
  1. HDD(or SSD) breakdown
  2. Awful code...needs to go back
  3. Collaborate with other programmers
  4. Make some experimental feature...
    - which can affect other modules
- VCS will help you

# Version Control System

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- A component of software configuration management, which is the management of changes to document, computer programs, large web sites, and other collections of information
  - *Wikipedia*
- A system that records changes to a file or set of files over time so that you can recall specific versions later.
  - Git official website
- A category of software tools that help a software team manage changes to source code over time
  - Atlassian Cooperation

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=> **Version Control**

=> **Backup**

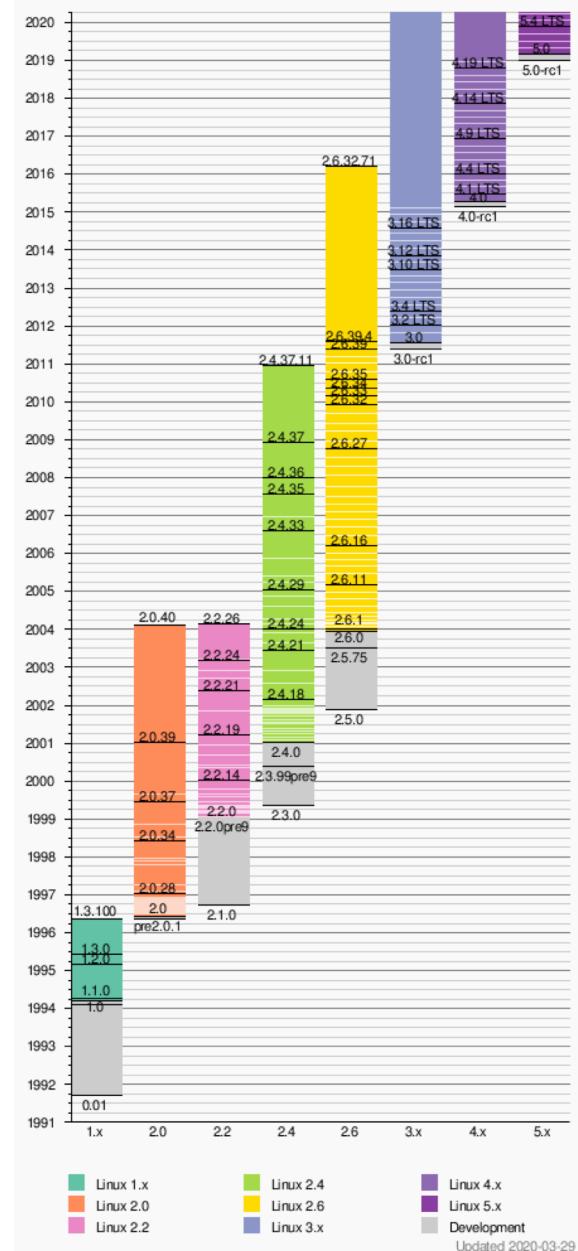
=> **Collaboration**

*Three main purposes of version control system*

# Main purposes of Version Control System

- Version Control
  - Software has *versions*
  - *linux major releases*
  - *current development history of linux*

|   |     |
|---|-----|
| Merge tag 'nfsd-5.7' of git://git.linux-nfs.org/projects/cel/cel-2.6  | ... |
|  torvalds committed 3 days ago                                   |     |
| platform/x86: intel_int0002_vgpio: Use acpi_register_wakeup_handler()   | ... |
|  jwrdegoede authored and Rafael J. Wysocki committed 4 days ago  |     |
| ACPI: PM: Add acpi_[un]register_wakeup_handler()  | ... |
|  jwrdegoede authored and Rafael J. Wysocki committed 4 days ago |     |
| Merge tag 'rtc-5.7' of git://git.kernel.org/pub/scm/linux/kernel/git/...  | ... |
|  torvalds committed 3 days ago                                 |     |
| Merge tag 'gpio-v5.7-1' of git://git.kernel.org/pub/scm/linux/kernel/...  | ... |
|  torvalds committed 3 days ago                                 |     |
| Merge tag 'dma-mapping-5.7' of git://git.infradead.org/users/hch/dma-...  | ... |
|  torvalds committed 3 days ago                                 |     |
| Merge tag 'threads-v5.7' of git://git.kernel.org/pub/scm/linux/kernel...  | ... |
|  torvalds committed 3 days ago                                 |     |



# Main purposes of Version Control System

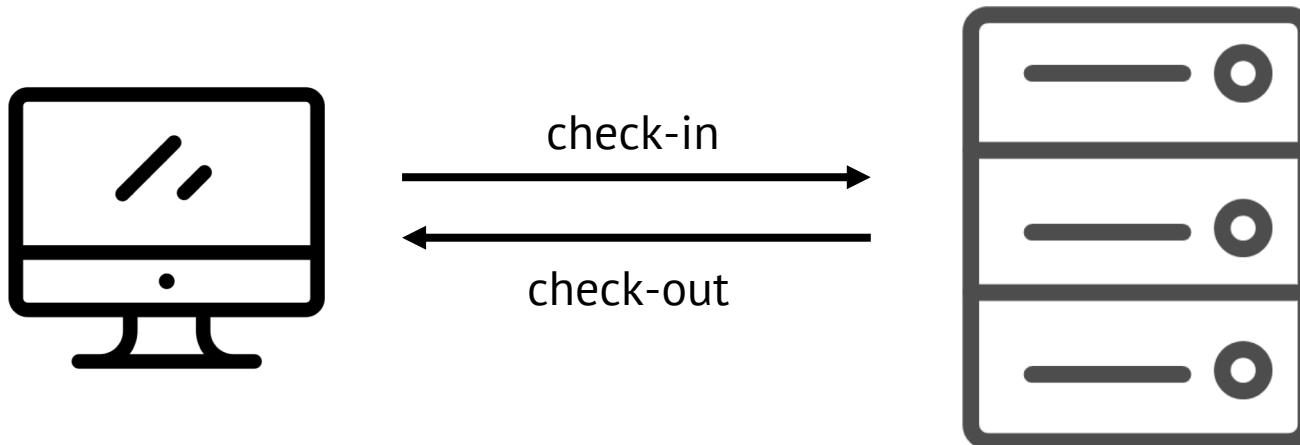
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- Imagine...
  - you need to record code history
    - code\_draft.cpp
    - code\_2.cpp
    - code\_3.cpp
    - code\_experimental.cpp
    - ...
  - Inefficient & burdensome
- Version control system:
  - automatically records the history
  - and also efficient!!

# Main purpose of VCS

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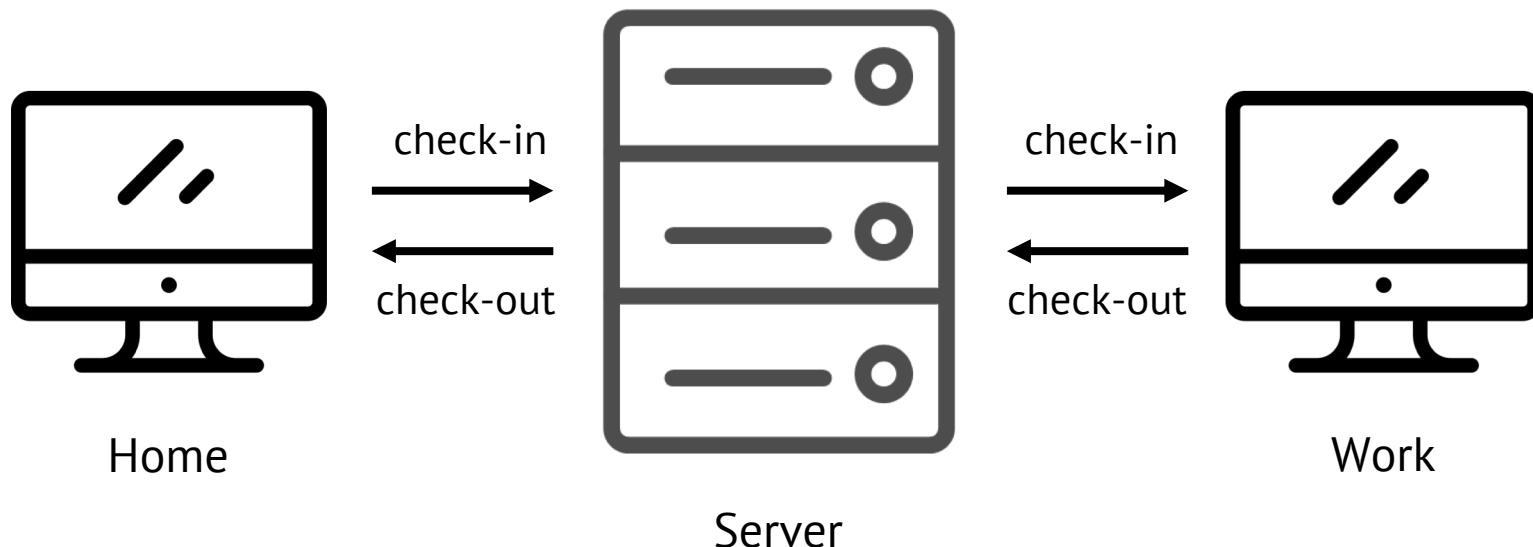
- Backup
- Even if your computer crashes, there is backup on the server
- Terminology!!
  - **Local Repository** (Your computer)
  - **Remote Repository** (Server)



# Main purpose of VCS

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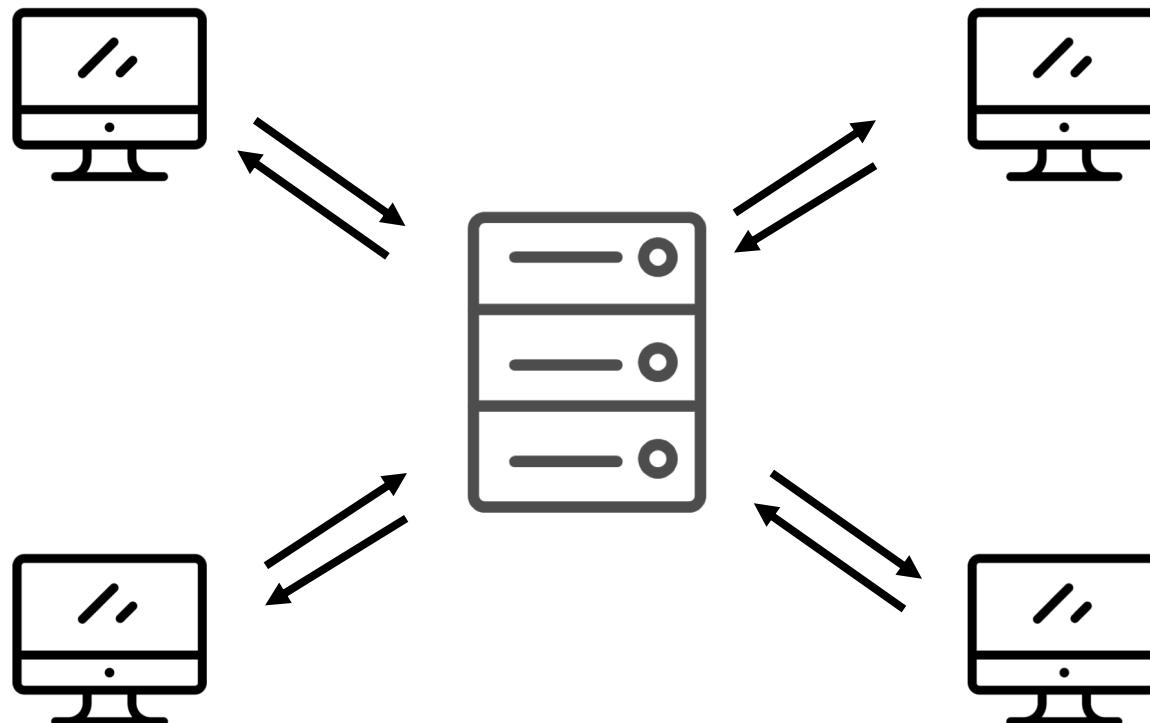
- Backup
- You can work everywhere,
  - by downloading / uploading your data from / to the server



# Main purpose of VCS

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- Collaborating
  - Easy collaboration with other programmers
  - Work in local repository, and upload it to remote repository!!



# Git

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- *Most famous* version control system
- Developed by ***Linus Torvalds*** (2015)
- Almost all of famous projects are managed by git
  - Including the programs we're using!!
  - gcc, visual studio code, extensions...



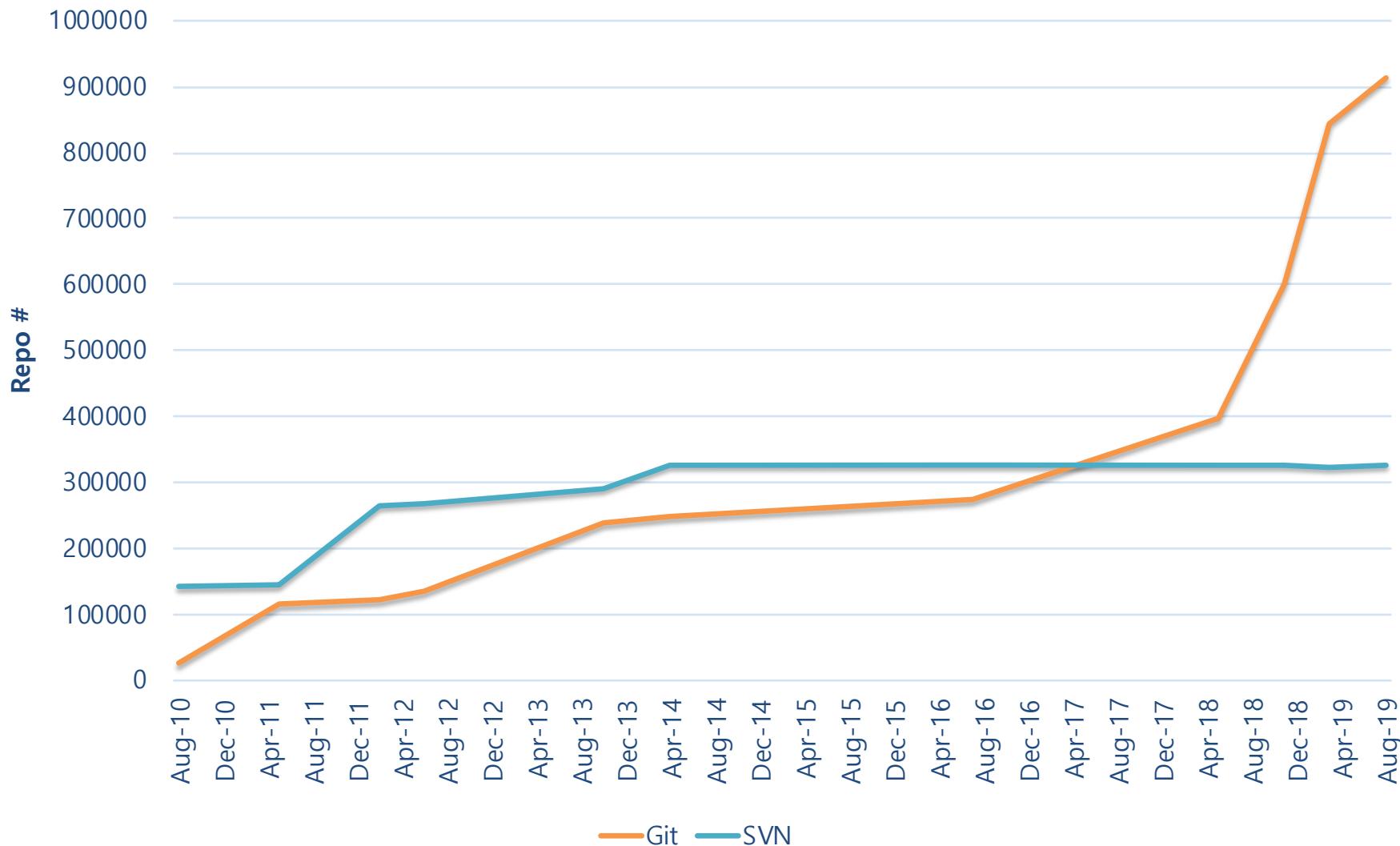
# Git

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- Why *Linus* developed git?
  - While developing linux...
  - He used VCS named *Bitkeeper*
  - However, one day...
    - Conflict b/w linux & bitkeeper occurred
    - As *linux* is open source project, meanwhile bitkeeper is commercial
  - Torvalds just made simple solution
    - Developing new VCS -> Git!!



# Git vs. SubVersion



# Git vs. Subversion

- cf) Why still lots of SVN repo?
  - Easy to learn (quite intuitive!!)
  - Lots of companies still use SVN...
    - due to old programmers
    - or to maintain legacy code



Covid-19 made old administration systems to be revised!!  
Shows the power of legacy code / programmers...

COBOL: ancient programming language (1959)

# Git

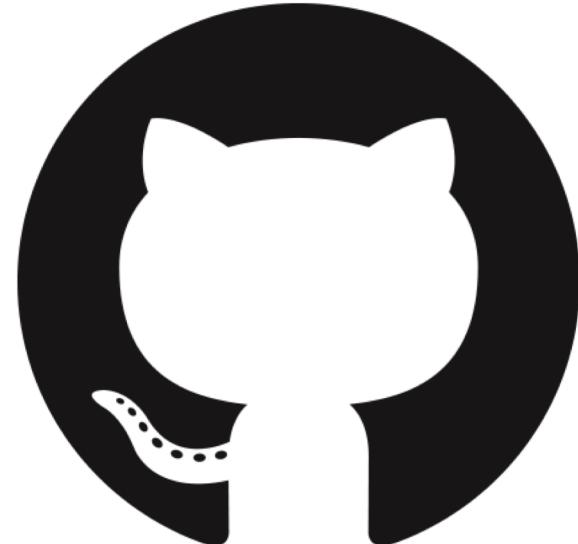
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- Okay...why git??
- For programmers, learning git is essential!!
- Because..
  - everybody makes mistakes
  - every computer can be crashed
  - every development can get sidetracked
- Also...
  - Almost every modern programmer is familiar to git
  - Almost every IT company requires git capability for their newcomers
  - Almost every open source project is managed with git
    - Want some contribution? Learn git!!

# Github

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- Provides web hosting service for version control using git
- Released in 2008
- Acquired by *Microsoft* (2018)
- Supports the functionalities of git & it's own features
  - Pull Request
  - Wiki
  - Issue
  - Fork
  - and else...



# Github

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- Lots of famous open source projects are publicized in Github
  - Linux (Operating System)
  - Mozilla Firefox (Web browser)
  - Thunderbird (e-mail management platform)
  - Pytorch (ML Library)
  - Wordpress (Blogging platform)
  - MySQL (Database management system)
  - Apache (HTTP Web Server)
  - Git
  - Github

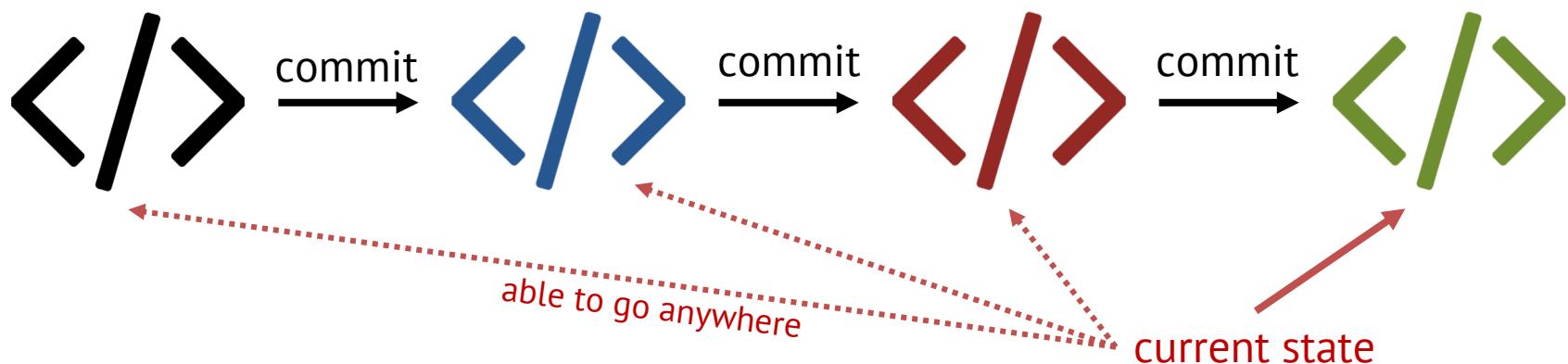
# Git vs. Github

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- Git
  - version control system
  - developers install locally to manage their code
- Github
  - online service
  - provides remote repository
  - developers (who use git) can connect and upload / download their resources
- Simple example: We can find [Git in Github!!](#)

# Git functionalities

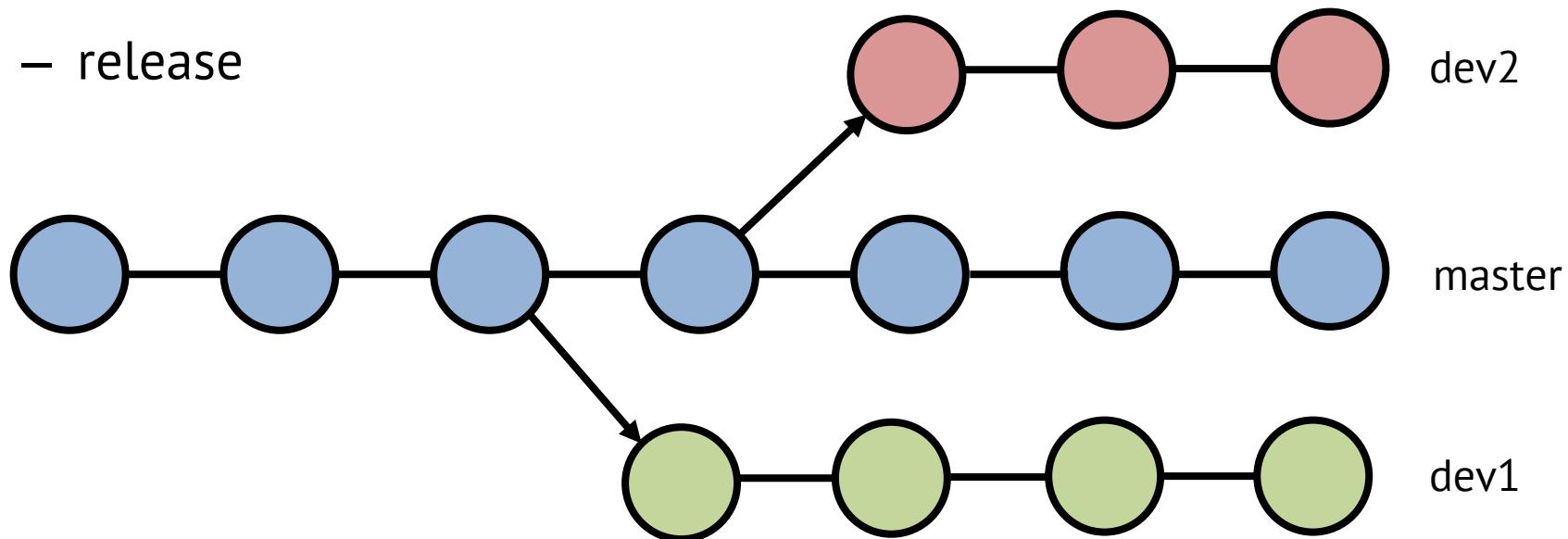
- Recording history
  - records the evolution of the code
  - provides way to go back (*checkout*)
  - ***commit*** each change



# Git functionalities

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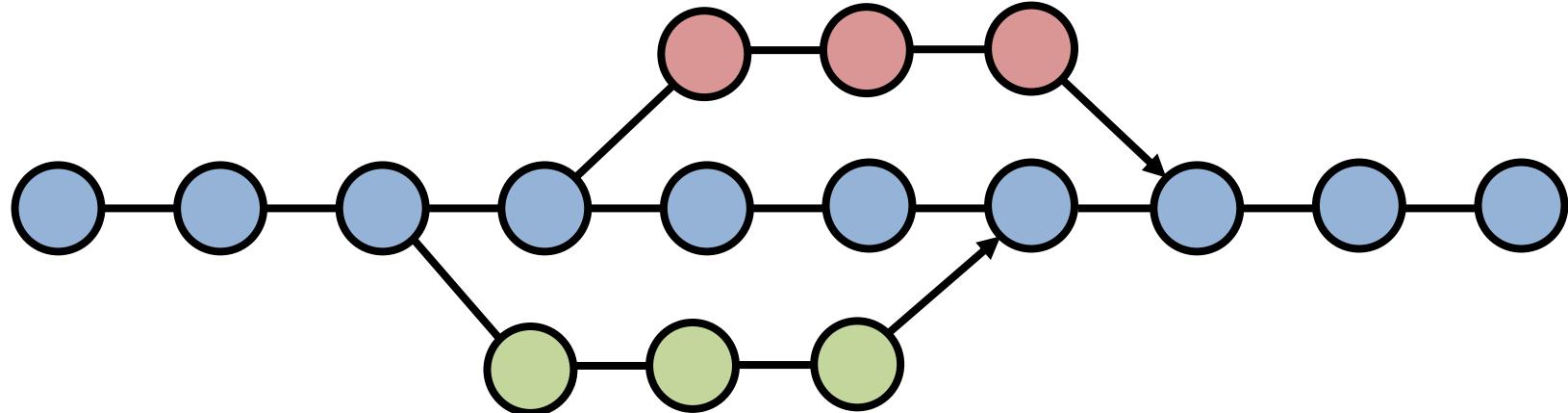
- Branching
  - developing with others
  - need to test some experimental features
  - bug fix
  - release



# Git functionalities

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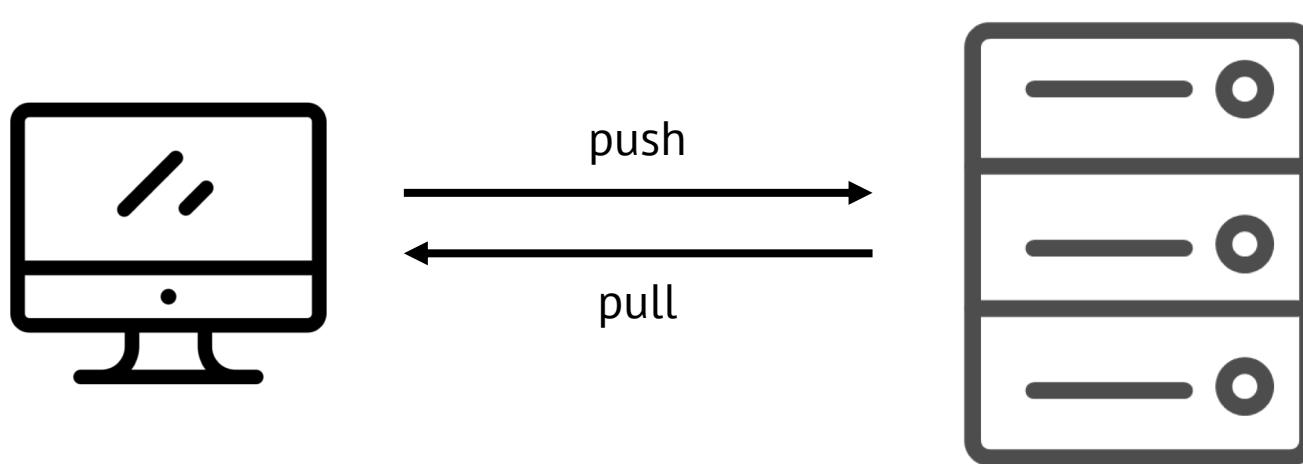
- Merge
  - merge the code from different branches
  - automatic merge...but sometimes makes conflict
  - Conventional way to combine works



# Git functionalities

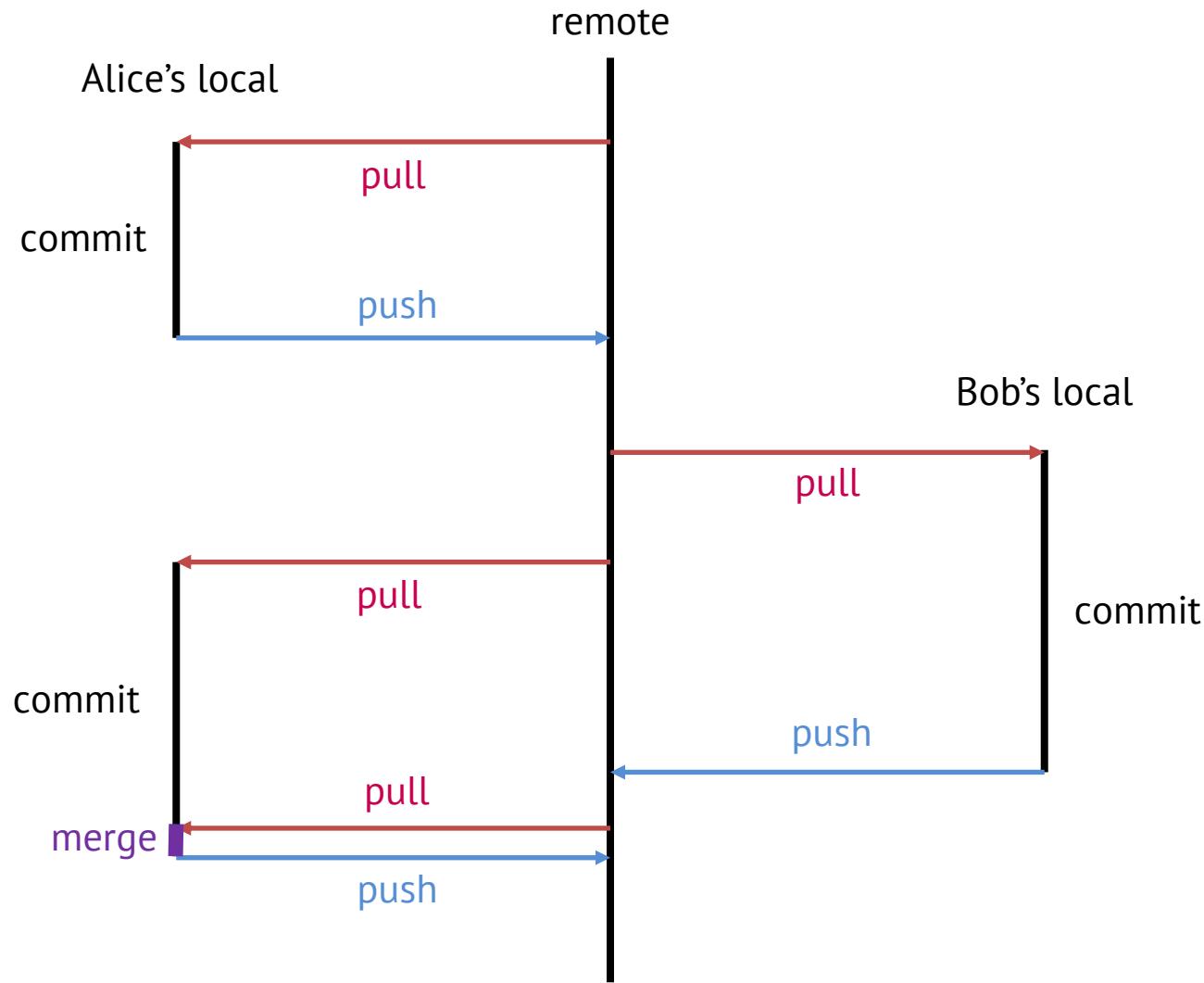
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- Communicate with remote repository
  - Github provides remote repository
- ***push*** (upload) / ***pull*** (download) data
- For backup / collaboration



# Git functionalities

- Collaboration with *push / pull*



# Git functionalities

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- Show history
  - show differences b/w commits
  - show the owner of certain code (to *blame* the author...)
  - show entire history (*log*)
  - *helps to control / manage project repository*

```
| * b0adc5f fixed issue where charge_now is greater than charge_full resulting in batt percentage greater than 100
|/
| * 75552da Merge pull request #249 from IngoHeimbach/master
|/
| * e8688fd Renamed all occurrences of "OSX" to "MACOS" in the macos notification count plugin
|/
| * f0d94c0 Merge pull request #248 from IngoHeimbach/master
|/
| * 55a1ae2 Added a segment for querying macOS notification counts
| * 92ffff05 Merge pull request #247 from dominikduda/master
|/
| * 50d1748 Rename prefix_mode_indicator to mode_indicator, add copy mode indication, update colors and style
| * 62fb530 Merge pull request #245 from dominikduda/master
|/
|/
| * 1fad6b7 Add return 0
| * e02d6de Add prefix_mode_indicator.sh
|/
| * f34031b Merge pull request #241 from mingchaoyan/master
|/
| * 367ae05 no logger necessary set-option -g status-utf8 on
| * bcf7bee Merge pull request #1 from erikw/master
|/
|/
| * cf5a96a Merge pull request #240 from TakkuMattsu/modify_vcs_branch_name
|/
| * 62a8c5f Modify vcs branch name
|/
|:
```

history of *tmux-powerline*

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Thank you!!

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