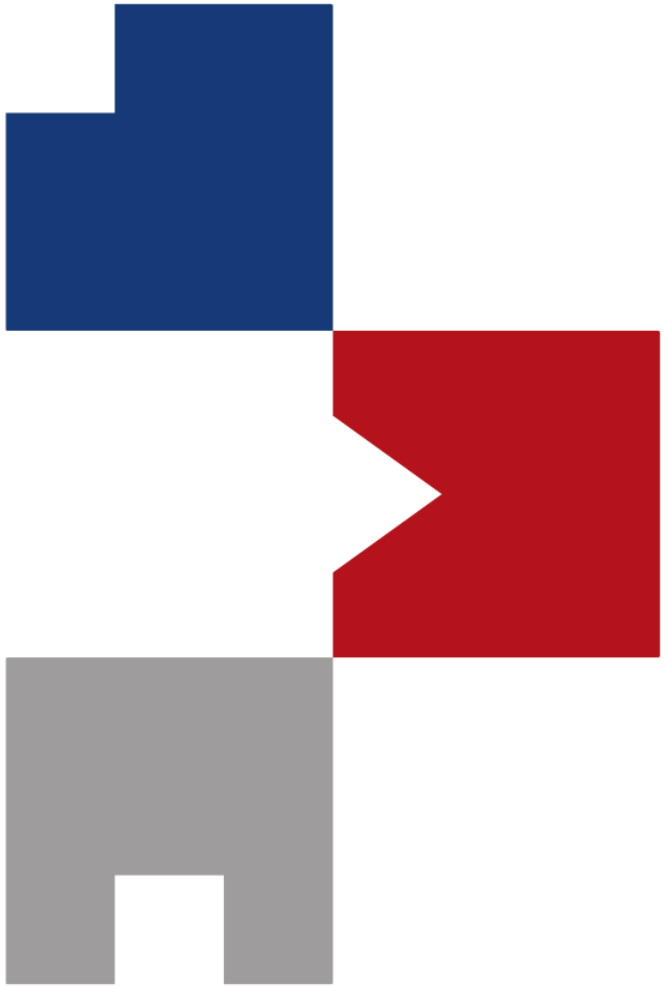


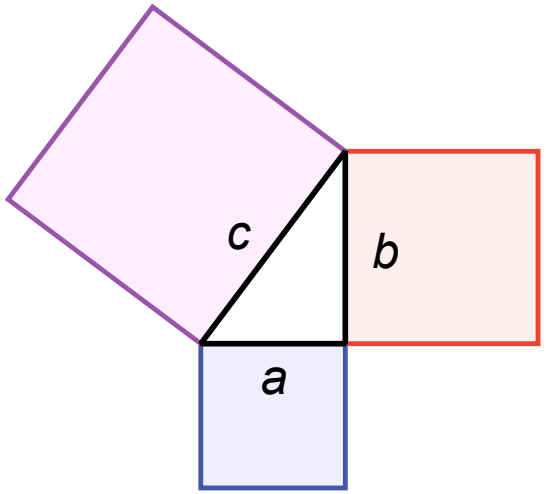
Introduction

Sunglok Choi, Assistant Professor, Ph.D.
Computer Science and Engineering Department, SeoulTech
sunglok@seoultech.ac.kr | https://mint-lab.github.io/

Table of Contents

Open-source Software

- Motivation
  - We don't pay **scientific or academic achievements**. We share its details (proof, properties, …) and use them freely.
    - e.g. Pythagoras's theorem ($a^2 + b^2 = c^2$), quadratic formula ($x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$)



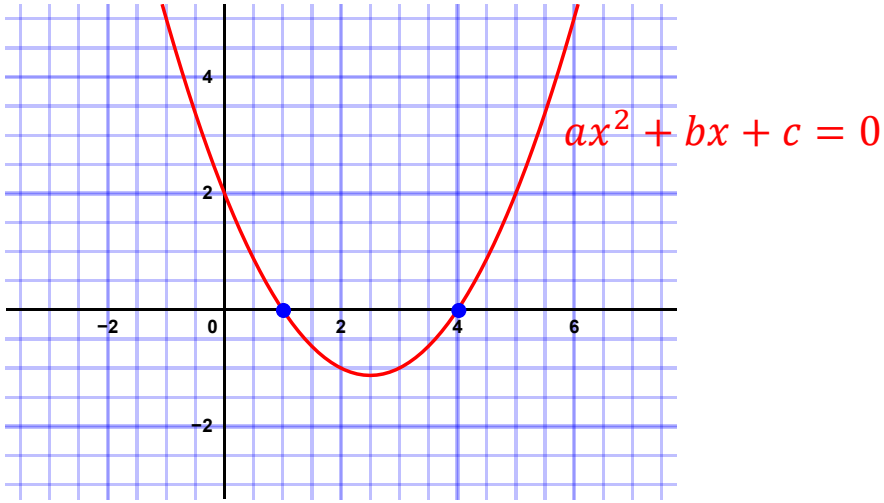
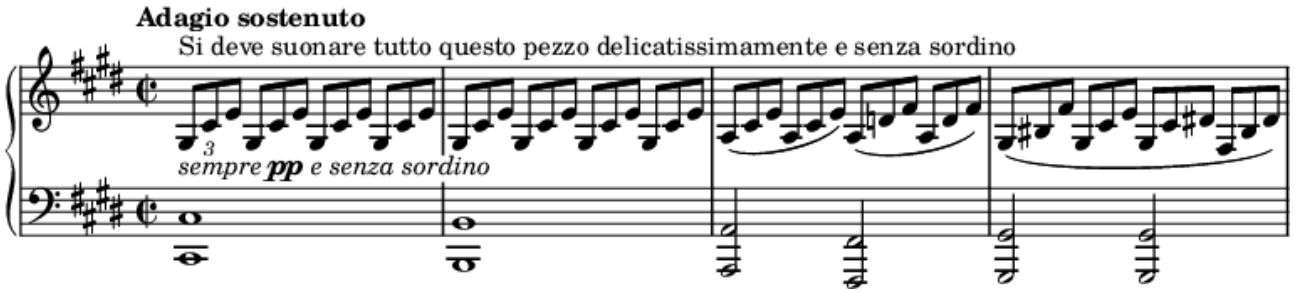


Image: Wikipedia (Pythagoras's theorem, quadratic formula)

Open-source Software

- Motivation
  - We don't pay **scientific or academic achievements**. We share its details (proof, properties, …) and use them freely.
    - e.g. Pythagoras's theorem ($a^2 + b^2 = c^2$), quadratic formula ($x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$)
  - How about **products**? (e.g. chairs, sandwiches, and gasoline)
  - How about **artworks**? (e.g. Mona Lisa by Leonardo da Vinci, Moonlight Sonata by Beethoven)
    - Note) Copyright



  - How about **software**?

Image: Wikipedia (Mona Lisa, Moonlight Sonata)

Open-source Software

- History
  - **GNU Project** (**G**NU is **N**ot **U**nix; 1984, Richard Stallman)
    - An extensive collection of *free software* (무료 자유 소프트웨어 in Korean)
      - e.g. GCC (GNU Compiler Collection), GIMP, GTK (GIMP Toolkit), GNOME, R, …
    - GPL license guarantees end users the freedom to run, study, share, and modify the software

  - **Linux** (1991, Linus Torvalds)
    - A family of open-source Unix-like operating systems based on the Linux kernel
      - e.g. Debian (1993), …, Ubuntu (2004), Android (2008), Chrome OS (2011)
      - Note) BSD Unix – FreeBSD – macOS, iOS, PlayStation (~ Unix – Linux – Ubuntu, Android, …)
    - Popularity (StatCounter retrieved on September 7th, 2021)
      - Desktop: 2.4% (Windows 76.13%)
      - Mobile: 72.73%
      - Tablet: 44.75% (iOS 55.17%)
      - Note) Servers: 75.3% (source: W3Techs)
      - Note) Supercomputers: 100% (source: TOP500)

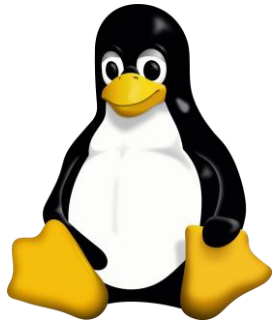
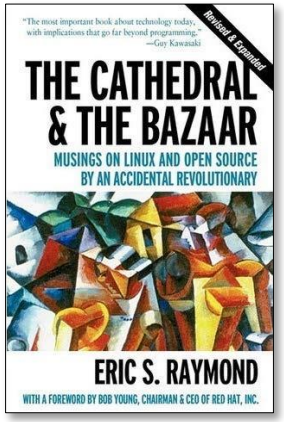


Image: Wikipedia (GNU, Linux), Wikimedia (Android)

Open-source Software

- **Open-source software (OSS)**
  - Computer software that is released under a *license* in which the copyright holder grants users the rights to use, study, change, and distribute the software and its source code to anyone and for any purpose (from Wikipedia)
    - OSS is usually developed in the form of a *open-source project*.
    - e.g. Mozilla Firefox, Apache, MySQL, **Python**, TensorFlow, **PyTorch** / LibreOffice, Shotcut, Blender
  - A famous example of *open collaboration* (개방, 공유, 협력 in Korean)
    - Open-source hardware (e.g. Arduino)
    - Wiki (e.g. Wikipedia, NamuWiki), open content (e.g. creative commons)
    - Crowdsourcing (blockchain)
  - Further readings
    - Eric Raymond, "The Cathedral and the Bazaar" [Homepage] [Korean Translation] / [한빛미디어; 무료]
      - Linus's law: "Given enough eyeballs, all bugs are shallow."
    - Joone, "만화로 나누는 자유/오픈소스 소프트웨어 이야기" [Homepage]



Open-source Software

- **Open-source software licenses [Wikipedia] [OLIS in Korean]**
  - e.g. Google vs. Oracle on Java API (2010-2021) [News in Korean]

    Samsung vs. Software Freedom Law Center on BusyBox (2005-2009) [News in Korean]

라이선스	복제, 배포, 수정의 권한 허용	배포시 라이선스 문서 첨부	배포시 소스코드 제공 의무와 범위	조합저작물 작성 및 타 라이선스로 배포 허용	수정내용 고지	특허 라이선스의 허용	이름/상표/상호의 사용 제한	보증의 부인	책임의 제한
License	Copy, Modification, Distribution	Attachment of License Statement	Scope of Code Opening	Distribution with Other Licenses	Notice of Amendments	Grant of Patent License	Restriction of Trademarks	No Approval	No Liability
GPL v3	O	O	All codes		O	O		O	O
LGPL v3	O	O	Derivative work	O	O	O		O	O
MPL v1.1	O	O	Files	O	O	O		O	O
MIT	O	O		O				O	O
BSD-3	O	O		O			O	O	O
Apache v2	O	O		O		O	O	O	O

Git

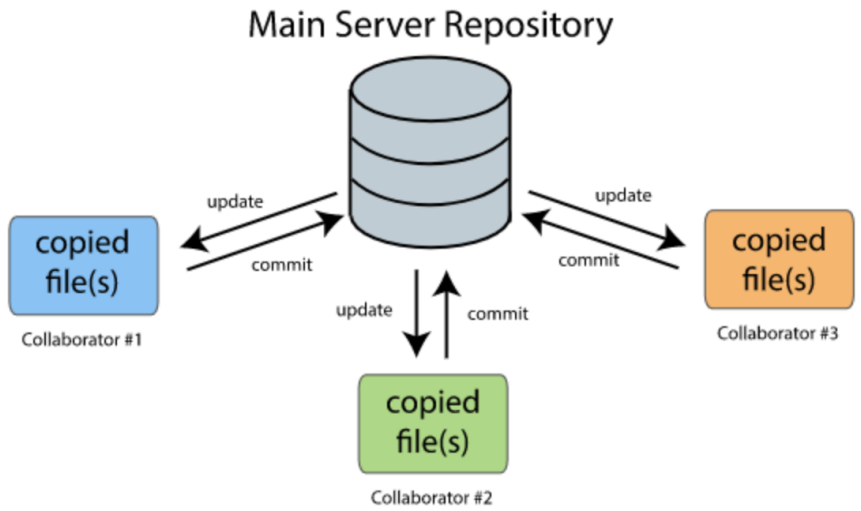
- How to collaborate in software development

  → **Version control systems (VCS)** manage revision of source codes (and also various types of files).

  e.g. CVS, Subversion, Git

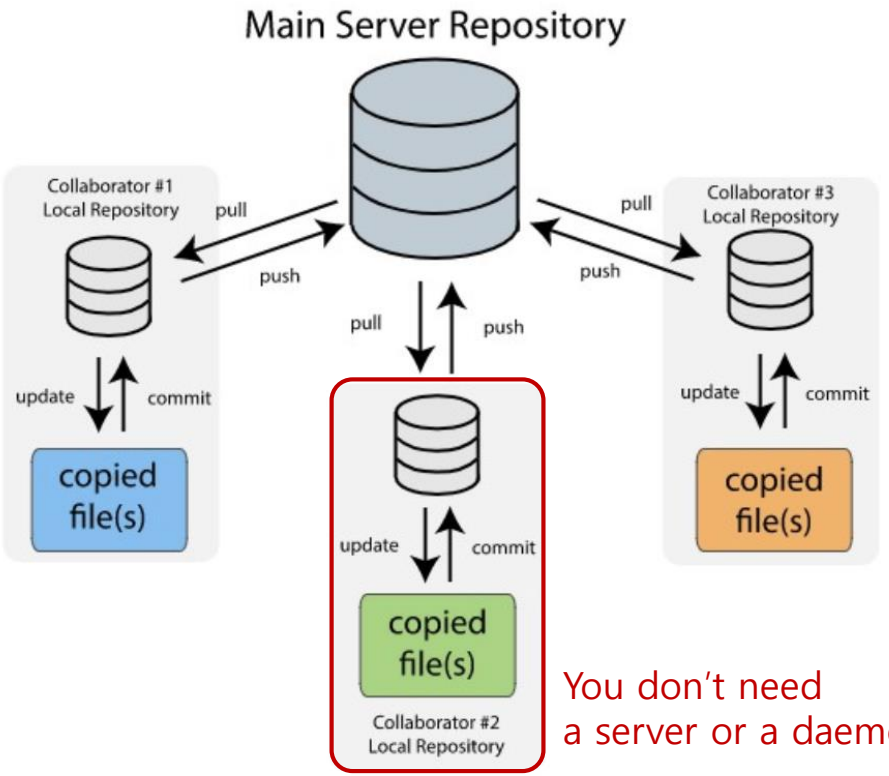
- **Git** (2005, Linus Torvalds)
  - A **distributed** version control system

Centralized version control system



A Centralized Version Control System. Users could check out files they wanted to work on, then commit them once they made their changes.

Distributed version control system



You don't need a server or a daemon.

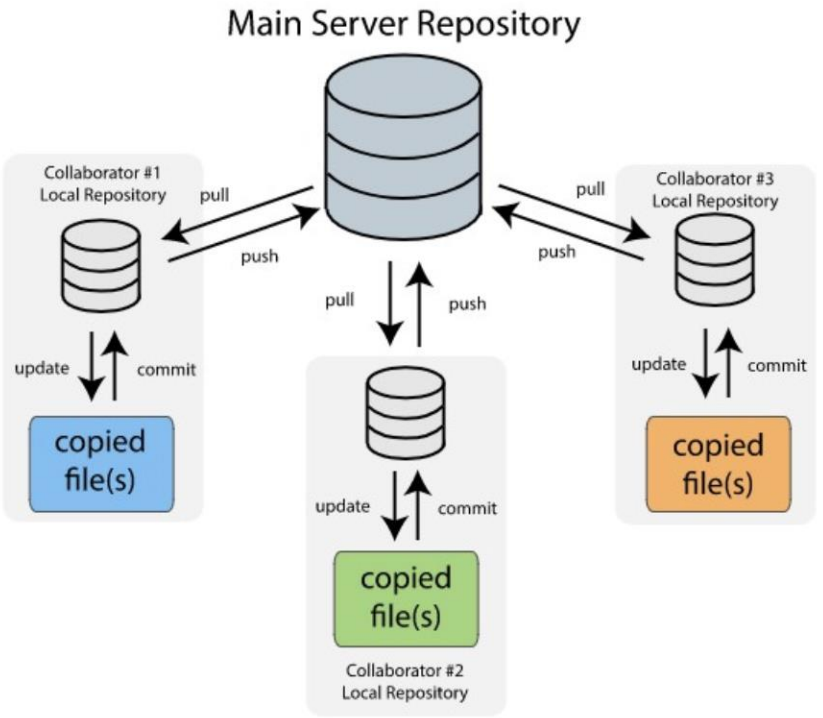
A Distributed Version Control System. Each collaborator has a local copy of the repository, so no Internet connection is required.

Image: dudgns3tp.log

Git

- Terminology [More]

Terms	Meanings
Repository	A storage for tracking files and their history - *Remote* repository: The main repository shared by all team members (default name: `origin`, default branch name: `master`) - *Local* repository: Your working copy in your system
Clone	Make a local copy of the remote repository
Commit	Apply the current changes to the local repository A unit of revision (revision numbers given by SHA, last commit: `HEAD`)
Push	Upload the local repository to the remote repository
Pull	Update the local repository from the remote repository
Branch	A version of the repository that diverges from the (main) repository
Fork	Make my remote repository from other remote repository
Merge	Integrate two branch together
Pull request	Notify `master` developers to merge my branch to the `master` repository (The developers may review your codes.)



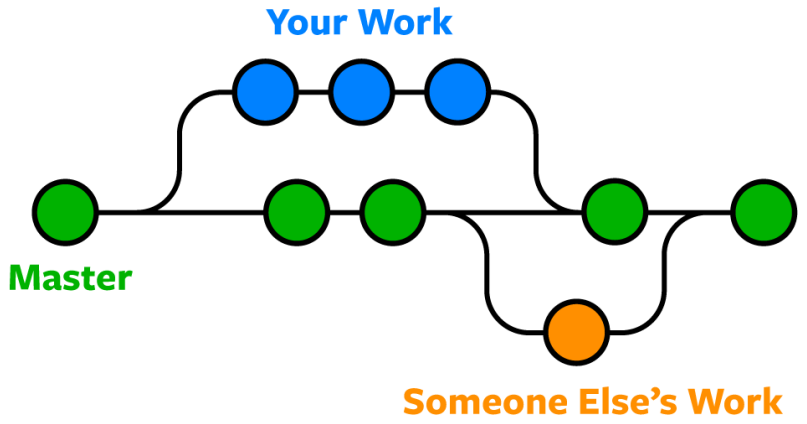


Image: dudgns3tp.log, Noble Desktop

Git

- Commands [Git Cheat Sheets]

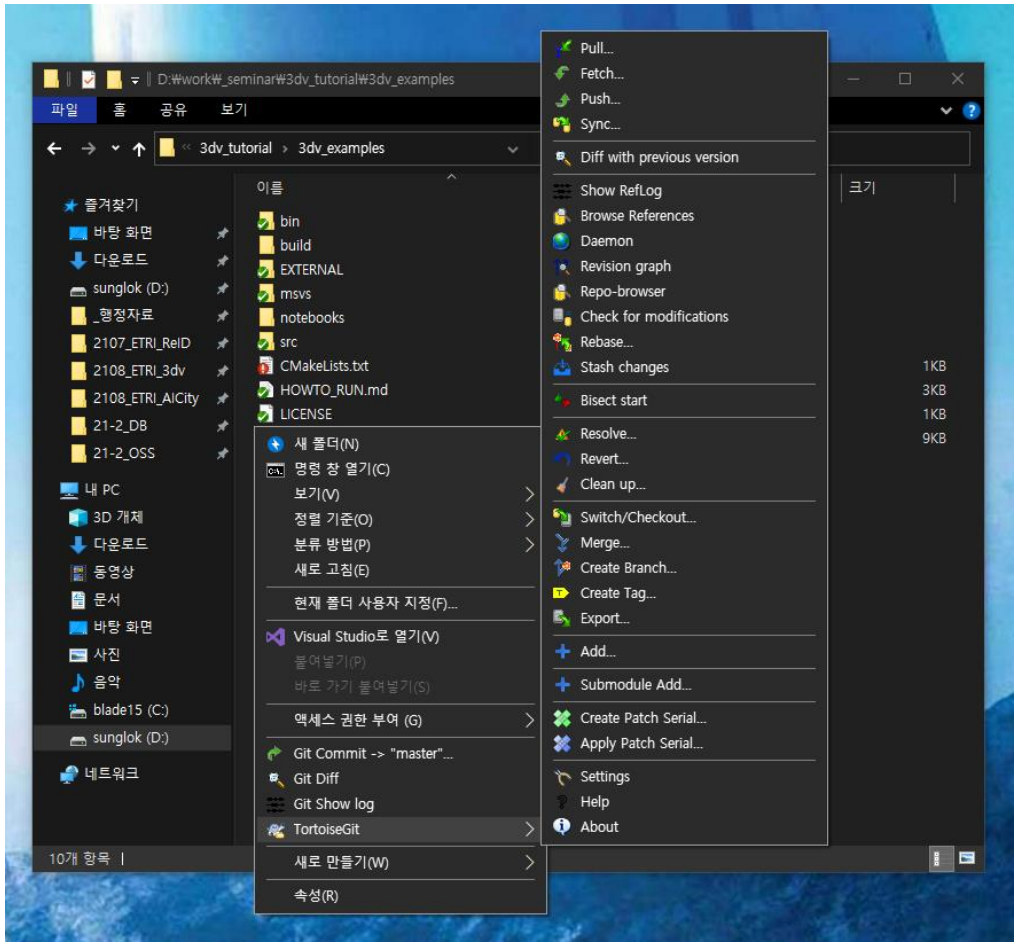
Note) `(optional)` `[write_your_text]`
Press `q` if you exit `log` or `diff`.

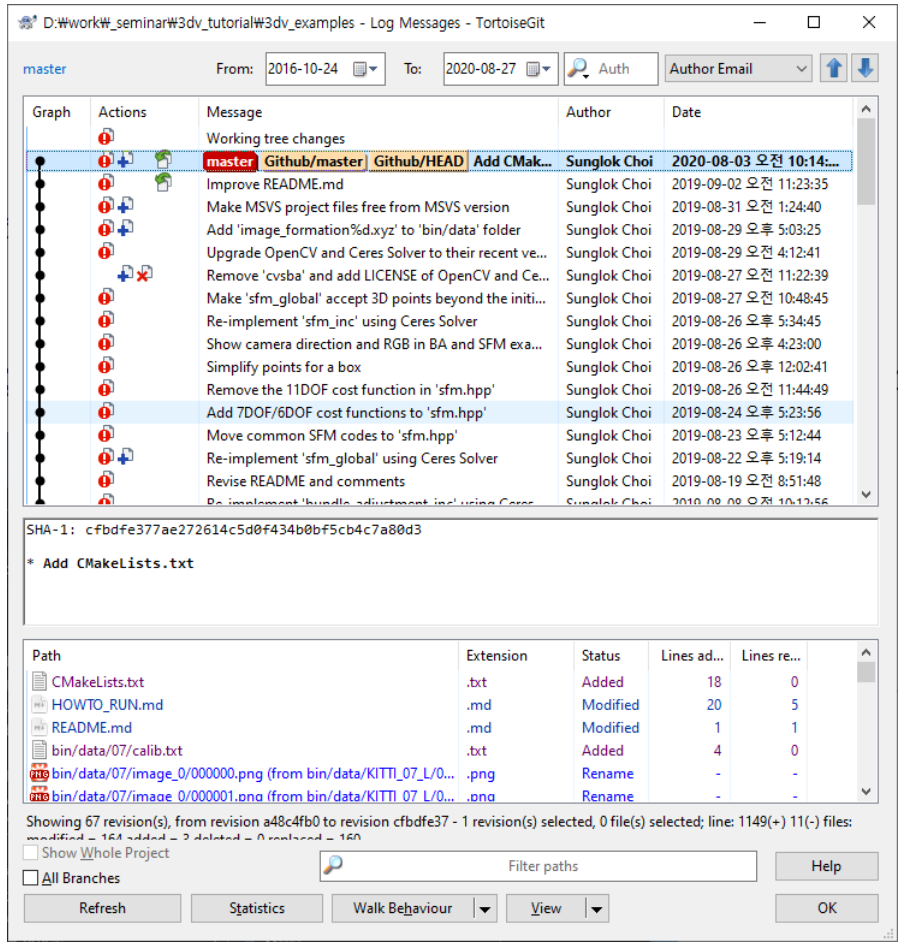
TODO	Commands
Create a new repository	`git init`
***Clone* a remote repository**	`git clone [url]`
Commit	`git commit (-m "[log message]")`
Push	`git push [remote] [branch]`
Pull	`git pull`
Add a file	`git add [file]`
Rename a file	`git mv [file-original] [file-renamed]`
Delete a file	`git rm (--cached) [file]`
Revert a file (or to a commit)	`git reset [file or commit]`
Show logs of the repository	`git log`
Show logs of a file	`git log --follow [file]`
Show status of current changes	`git status`
Show details of current changes	`git diff ([file])`

Image: xkcd

Git

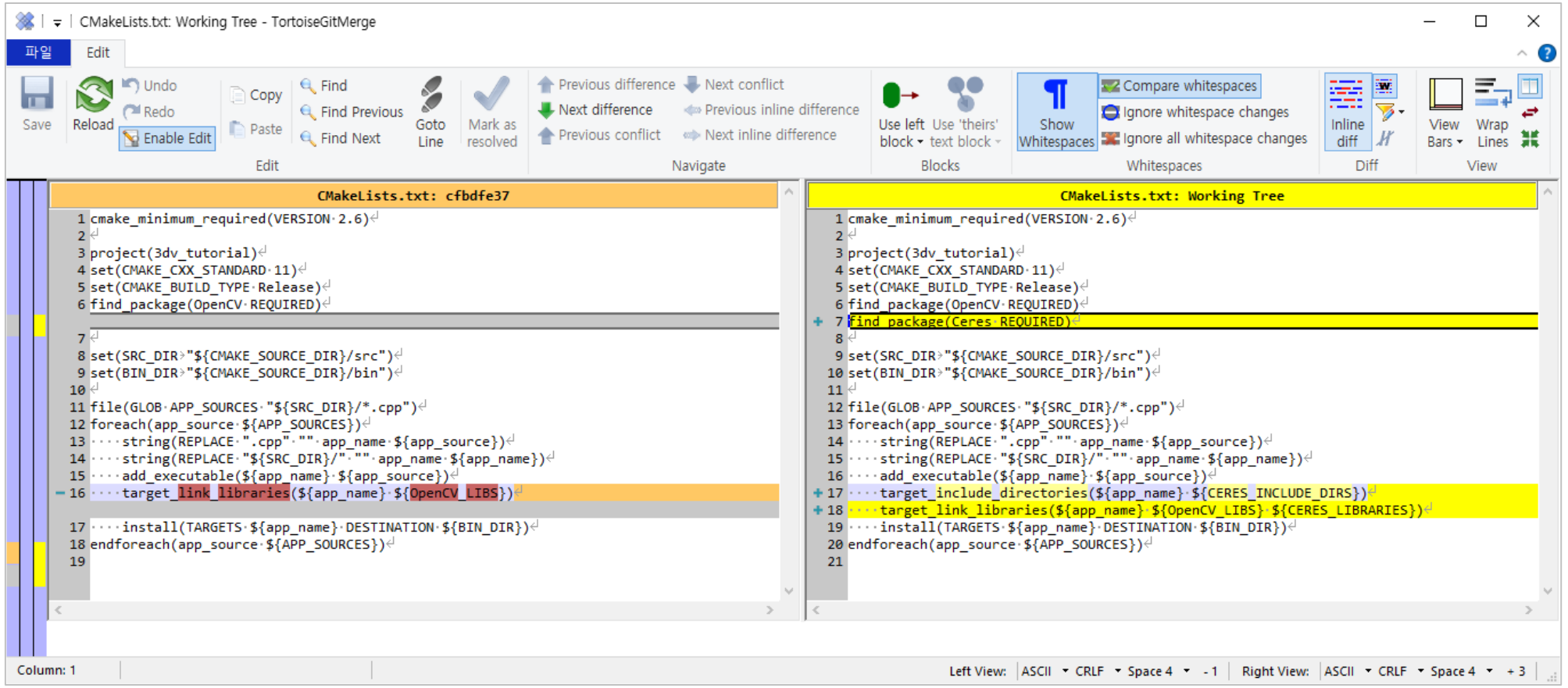
- ~~Commands [Git Cheat Sheets]~~
- GUI clients [List]
  - I recommend **TortoiseGit** for Windows, which extends *File Explorer* as a Git GUI client.





Git

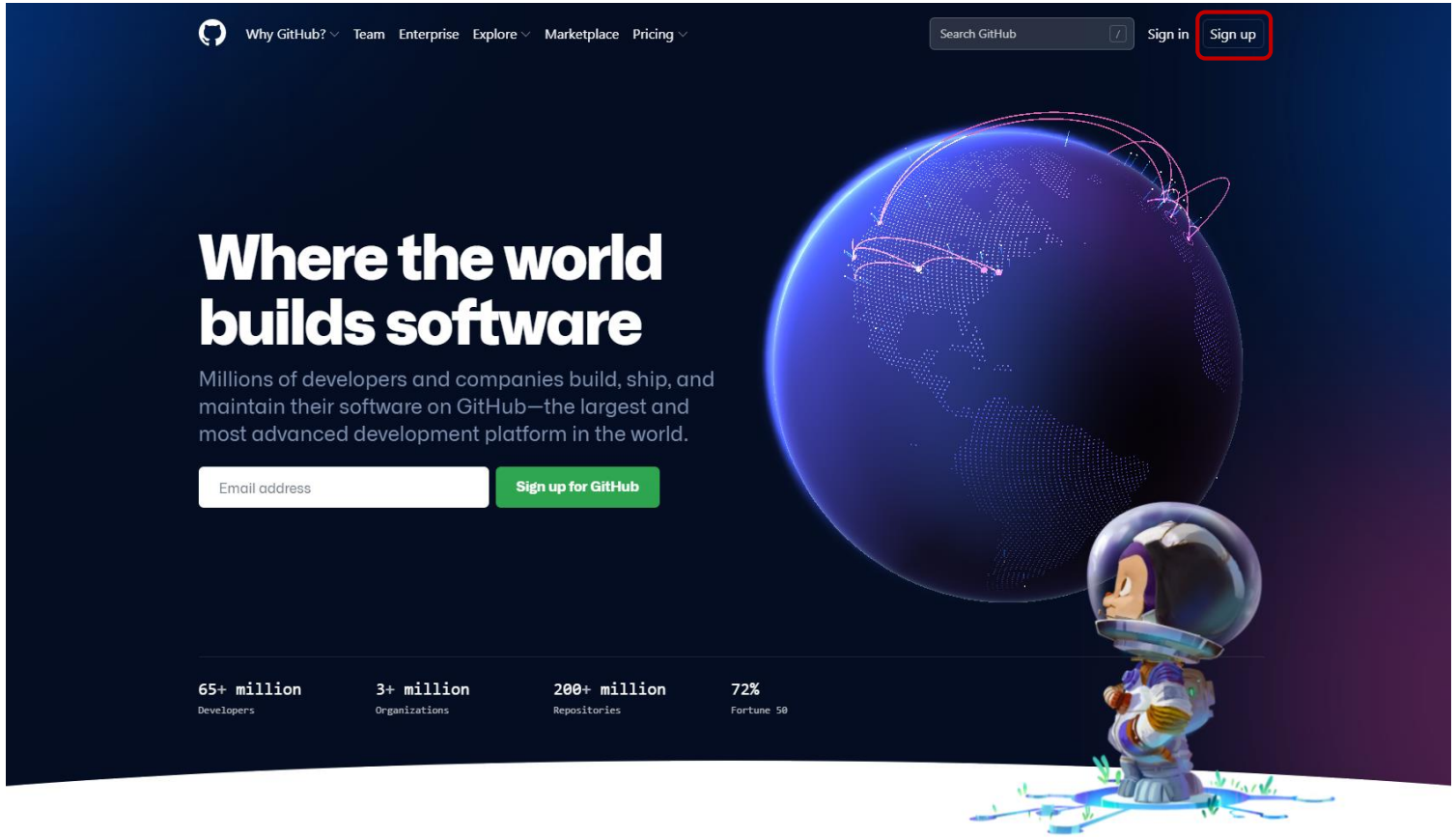
- ~~Commands [Git Cheat Sheets]~~
- GUI clients [List]
  - I recommend **TortoiseGit** for Windows, which extends *File Explorer* as a Git GUI client.



Tip! You can use this diff tool out of Git including PPTX and XLSX.

Github

- **Github**
  - Internet hosting for Git-based remote repositories
  - Commonly used to host open-source projects [Check the most starred repositories]
  - Note) Please **sign up** (make your account) if you have no account and check Github Education Program.



Markdown

- **Markdown**
  - A lightweight markup language for formatted documents → Markdown
    - Note) Markup languages: HTML (HyperText Markup Language), XML (Extensible Markup Language)
    - File extension: `.md` or `.markdown`
  - Why?
    - **Concise**
    - **Human-friendly** (easy to use and understand)
  - Popularity
    - Blogging, wiki, instant messaging
    - **Software documentation (README files)**
  - Further readings
    - Mastering Markdown, Github
    - Online practice) Markdown Live Preview
    - Editors) Atom, Visual Studio Code, Notepad++, Vim, …, Typora (specialized for markdown)

Markdown Syntax

- Headers

```
# This is an <h1> tag
## This is an <h2> tag
###### This is an <h6> tag
```

- Emphasis

```
*This text will be italic*
_This will also be italic_

**This text will be bold**
__This will also be bold__

_You **can** combine them_
```

- ~~Strikethrough~~

```
~~This~~ will appear crossed out.
```

- Note) Emoji [Emoji Cheat Sheet for Github Flavored Markdown]

```
:smile:
```

Example: Mastering Markdown, Github

Markdown Syntax

- Lists
  - Unordered

```
* Item 1
* Item 2
  * Item 2a
  * Item 2b
```

  - Ordered

```
1. Item 1
1. Item 2
   1. Item 2a
   1. Item 2b
```

  - Task Lists

```
- [x] @mentions, #refs, [links](), **formatting**, and <del>tags</del> supported
- [x] list syntax required (any unordered or ordered list supported)
- [x] this is a complete item
- [ ] this is an incomplete item
```

Example: Mastering Markdown, Github

Markdown Syntax

- Links

```
http://github.com - automatic!
[GitHub](http://github.com)
```

- Images

```
![GitHub Logo](images/logo.png)
Format: ![Alt Text](url)
```

- Blockquotes

```
As Kanye West said:

> We're living the future so
> the present is our past.
```

- Inline code

```
I think you should use an
`<addr>` element here instead.
```

- Images with custom resizing and custom alignment

```
<p align="center">
<img src="images/logo.png" alt="Github Logo" width="50%" />
</p>
```

Example: Mastering Markdown, Github

Markdown Syntax

- Syntax highlighting

```
```javascript
function fancyAlert(arg) {
  if(arg) {
    $.facebox({div:'#foo'})
  }
}
```
```

- Tables [Tables Generator]

```
First Header | Second Header
------------ | -------------
Content from cell 1 | Content from cell 2
Content in the first column | Content in the second column
```

First Header	Second Header
Content from cell 1	Content from cell 2
Content in the first column	Content in the second column

Example: Mastering Markdown, Github

Markdown Example

- My Github profile

```
![header](https://capsule-render.vercel.app/api?type=waving&color=auto&height=200&section=header&text=Sunglok%20Choi&fontSize=32)

I am Sunglok Choi, Assistant Professor in the [Dept. of Computer Science and Engineering](https://computer.seoultech.ac.kr/), [SeoulTech](https://en.seoultech.ac.kr/).

My research interests include
* :car: **Robot Navigation**: Localization, SLAM, Path Planning, Path Following
* :camera: **Computer Vision**: Robust Regression, 3D Vision (Visual Odometry, Visual SLAM, SFM)

I open some of my research works: [Triangulation Toolbox](https://github.com/sunglok/TriangulationToolbox) (MATLAB) and [RANSAC Template Library](https://github.com/sunglok/rtl) (C++).

I am always happy :smile: share my knowledge :blue_book: with others. Please visit the follows if you are interested.
* [An Invitation to 3D Vision: A Tutorial for Everyone](https://github.com/sunglok/3dv_tutorial)
* Python in 3 Hours
* Programming meets Mathematics
* Machine Learning Brief with scikit-learn
* [Deep Learning Brief with PyTorch](https://github.com/mint-lab/dl_tutorial)
* [MINT Lab's Know-Where](https://github.com/mint-lab/know-where)
* [Awesome Robotics Datasets](https://mint-lab.github.io/awesome-robotics-datasets/)
```

Markdown Example

- My Github profile

18 lines (14 sloc) | 1.2 KB

Raw Blame

Sunglok Choi

I am Sunglok Choi, Assistant Professor in the Dept. of Computer Science and Engineering, SeoulTech.

My research interests include

- 🚗 **Robot Navigation**: Localization, SLAM, Path Planning, Path Following
- 📷 **Computer Vision**: Robust Regression, 3D Vision (Visual Odometry, Visual SLAM, SFM)

I open some of my research works: Triangulation Toolbox (MATLAB) and RANSAC Template Library (C++).

I am always happy 😄 to share my knowledge 📘 with others. Please visit the follows if you are interested.

- An Invitation to 3D Vision: A Tutorial for Everyone
- Python in 3 Hours
- Programming meets Mathematics
- Machine Learning Brief with scikit-learn
- Deep Learning Brief with PyTorch
- MINT Lab's Know-Where
- Awesome Robotics Datasets

Summary

- **Open-source Software**
  - Motivation: **Freedom** to run, study, share, and modify the software (~ scientific/academic achievements)
  - History: **GNU Project**, **Linux**, …, Python, …, PyTorch, …
  - What is open-source software?
  - Open-source software licenses: **GPL** – **LGPL** – **MIT/BSD** – **Apache**
- **Git and Github**
  - Motivation: **Collaboration** for software development
  - What is Git? A **distributive** version control system
  - Terminology, commands, and **GUI clients**
  - What is Github? **Start to plant your seeds (and let your flowers bloom)!**
- **Markdown**
  - What is Markdown? A **lightweight** markup language for writing a formatted text
  - Markdown syntax: You still remember, right?
  - Markdown example