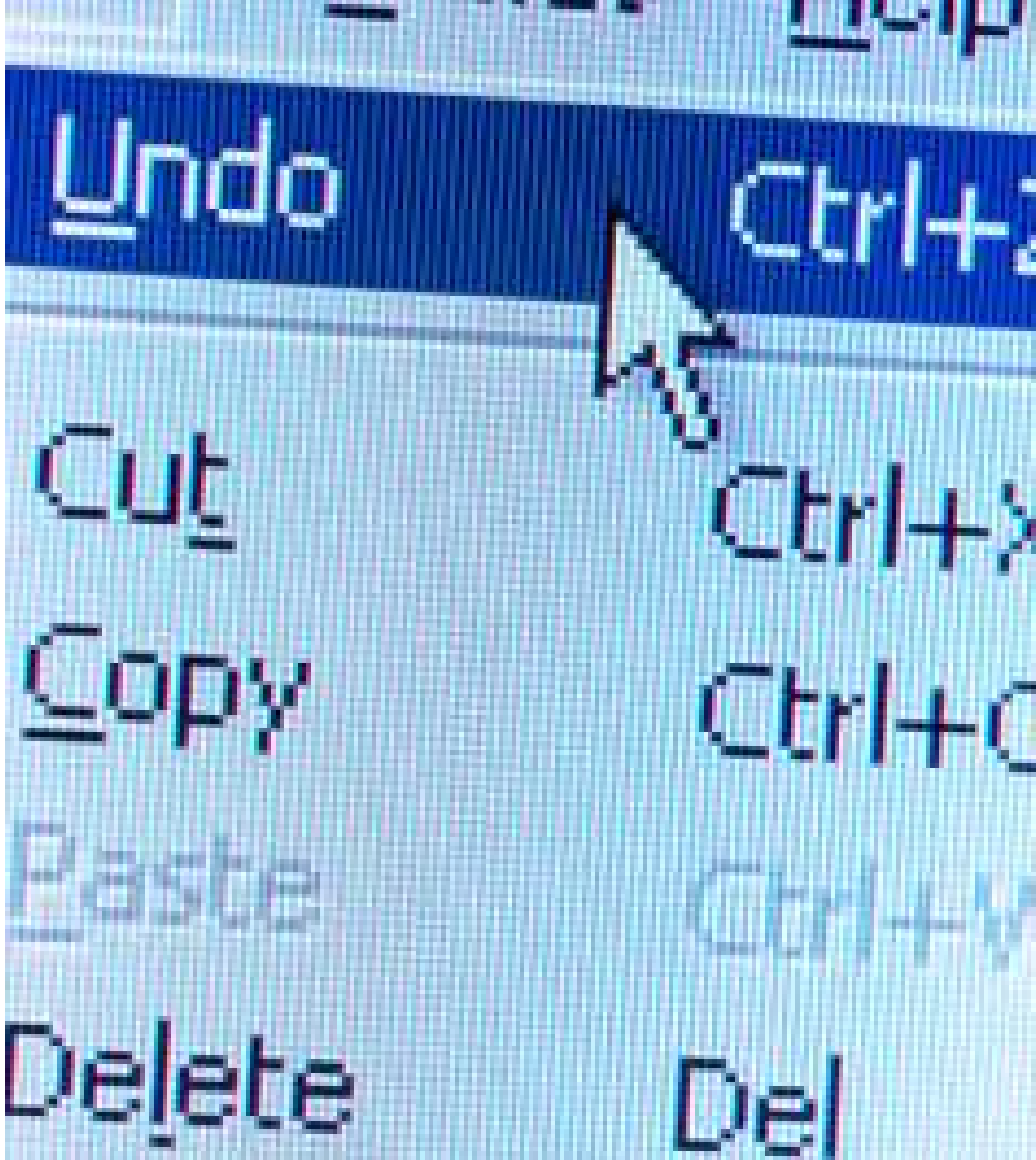
Introduction to GitHub and Version Control


"FINAL".doc
FINAL.doc!
FINAL_rev.2.doc
FINAL_rev.6.COMMENTS.doc
FINAL_rev.8.comments5.
CORRECTIONS.doc
track changes
FINAL_rev.18.comments7.
corrections9.MORE.30.doc
FINAL_rev.22.comments49.
corrections.10.#@$%WHYDID
ICOMETOGRADSCHOOL????.doc
JORGE CHAM © 2012
WWW.PHDCOMICS.COM

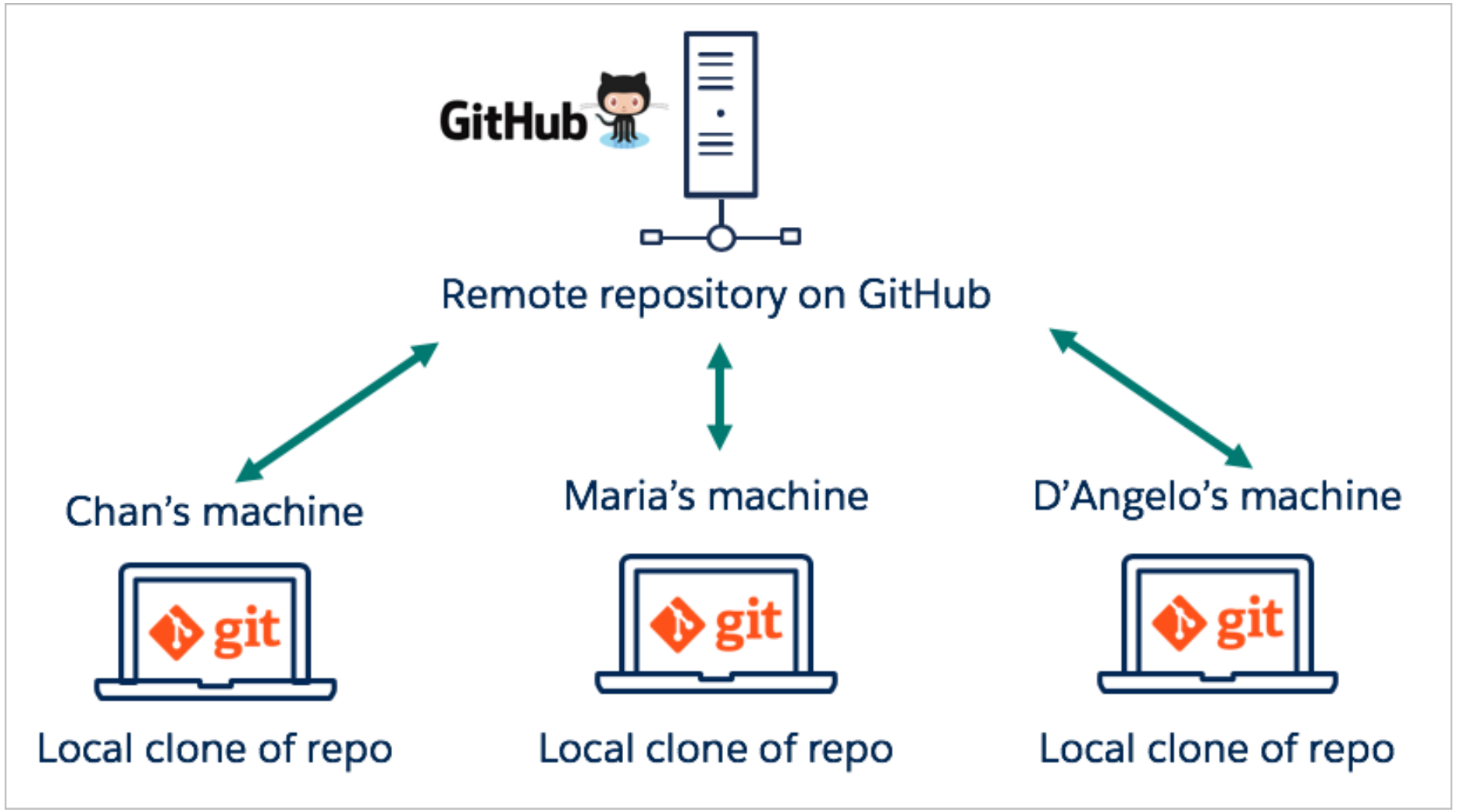
Why Use Version Control?

- Review history of your changes.
- Restore older code versions, like an unlimited undo.
- Saves you emailing files back and forth if you are working with others.
- Different people can make changes to the same code in parallel.



What is Git and GitHub?

Git: Version control tool to manage code history. Runs on the command line.
GitHub: Hosting service for Git repositories.
GitHub Desktop: A GUI for using Git commands.


GitHub
Remote repository on GitHub
Chan's machine
Maria's machine
D'Angelo's machine
git
git
git
Local clone of repo
Local clone of repo
Local clone of repo

Creating a GitHub Account

1. Go to github.com and click on "Sign up" in the top-right.
2. Follow the instructions to create an account.
3. Verify your email adddress with GitHub.
4. Configure 2FA.

Creating a Repo

1. Open GitHub Desktop.
2. In the top-menu go to File and then click "New repository...".
3. Give the repository a name and a description.
4. Set a local path for the repository.

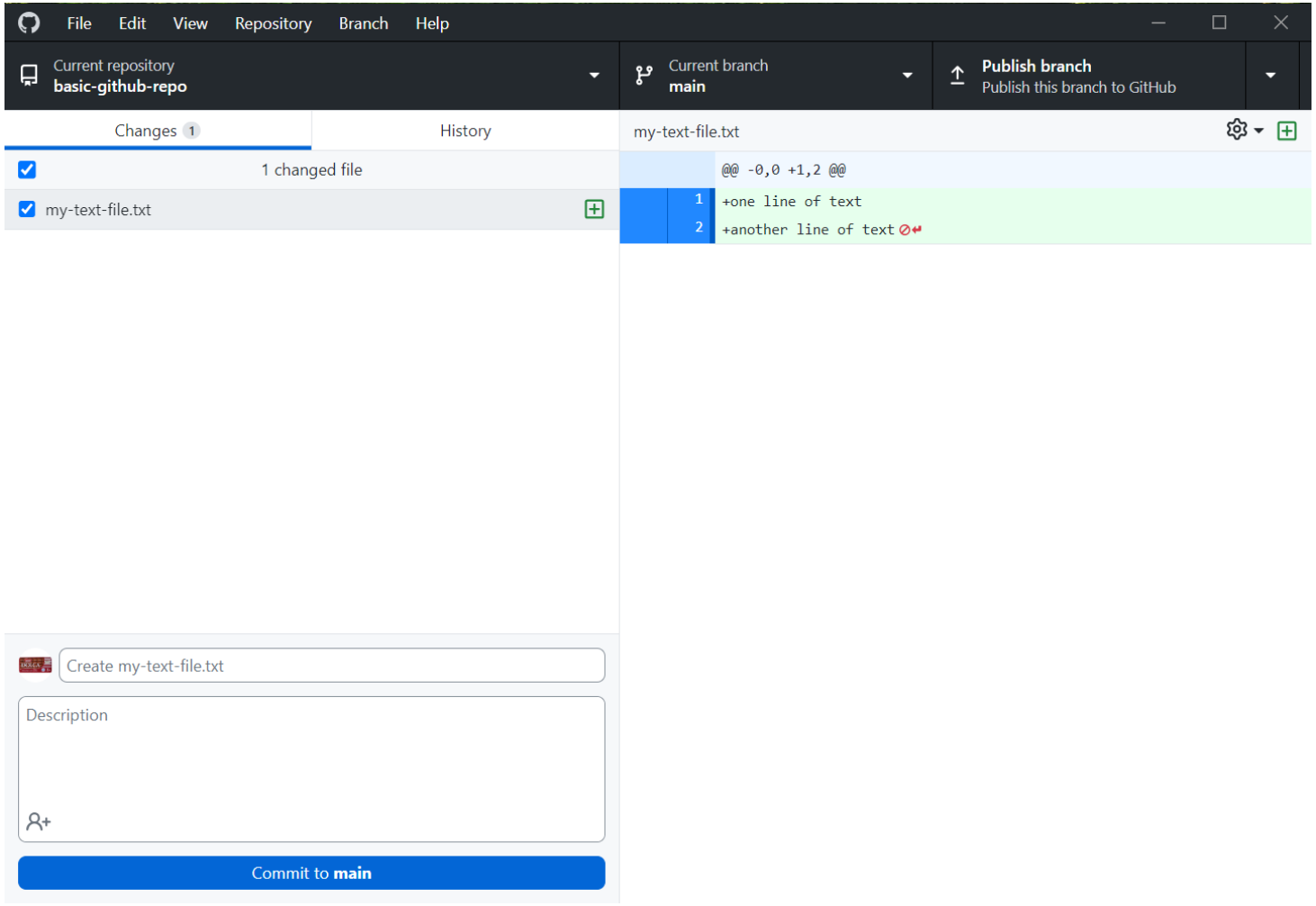
Creating a Text File

Now let's create a simple text file and add two lines of text to it. This will cause a change to appear in GitHub Desktop.

1. On the top-level menu go to Repository > Show in Explorer / Finder.
2. Create a text file in this folder and add two lines of random text to it.

If you're on Mac you can use `touch a-text-file` to create an empty file. Then `echo "blahblahblah" >> a-text-file` should add something to the file. Do that a second time and you'll have a file with two lines of text in it.

Changes Tab



The Changes tab shows us what has changed in our files since the most recent commit.

Staging and Commiting Files

Once we've made some changes that we want to record, we can make a *commit*.

1. Tick the checkbox next to the file you want to include in the next commit. This *stages* the file.
2. Give the commit a message. This should describe the changes that you have made to the file(s). You can also provide an optional description.
3. Click the blue Commit button. This will now create a new "snapshot" of our repository.

History

Take a look at the History tab. You can now see your commit with its message. The right hand pane will show us what was changed in this commit.

Changing / Removing Lines

Now change the *first* line of your text file and see what happens in the Changes tab.

Resetting a Change

- You might change a file, then realise that this isn't actually a change you wanted.
- If you haven't commited yet then you can correct this by resetting the file.
- In GitHub Desktop this is done by right clicking the file in the Changes tab and clicking on "Discard changes..."
- This will take the file back to the state it was in in the most recent commit.

Amending Commits

- Sometimes we make a slight typo in our commit messages or realise it's missing something that it ought to say.
- In this case, you'd *amend* your commit.
- In GitHub Desktop this is done by right clicking the commit in the History tab and then changing your commit message.
- Ideally you want to do this *before* pushing the code to GitHub. (I will talk about pushing code in a bit...)

So how often to commit?

- When it *feels right*...
- When you've done a 10-15 minute "chunk" of work.
- When you have something that may doesn't fully solve the problem you're working on, but is at least a "complete" step towards solving that problem.

Smaller commits make it easier to isolate problems.

Publishing a Repo

- Publishing allows us to have a copy of the repo on GitHub.
- You can hit the publish button to do this.
- Now take a look at your GitHub profile and see the repository that's been added.

Cloning

- Make a local copy of a remote repository.
- Transfer code you've written from one machine to another.
- Retrieve code from someone else that's available on GitHub.

Ignoring Files

- A `.gitignore` file lets Git know that you don't want a certain file to be tracked with version control.
- In GitHub Desktop we can right click a file and add it to `.gitignore.`
- It will no longer appear in the Changes tab unless it's removed from `.gitignore.`
- The `.gitingore` file is also something you will want to track with version control.

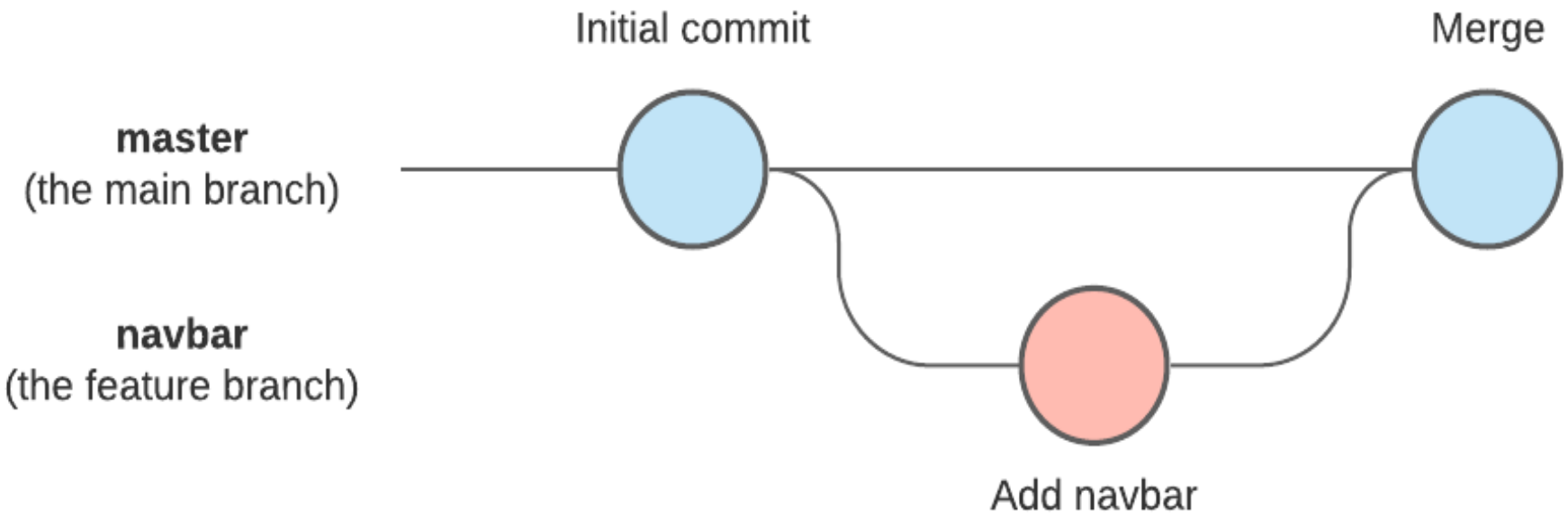
Ignoring Files

Here's one example of why it would be useful to ignore a file...

https://github.com/search?q=api+key+removing&type=commits&s=&o=desc

Branching

- Allows you to create an "offshoot" of your repository.
- Keep the working code "safe" while you attempt to add a new feature to it.



Overview

- You make a change to a file and *stage* it in GitHub Desktop.
- You then *commit* the changes, which creates a snapshot of your repository.
- You can then *push* these changes to GitHub so that the code is on your GitHub account.
- By using *branches* you can manage multiple different versions of your code.
- With *cloning* to you get code made by others from GitHub and use it too.

Finding Code on GitHub

- Topics: hhttps://github.com/topics/machine-learning
- Searching by language: https://github.com/search?q=generative+language%3AProcessing&type=repositories&l=Processing
- Looking at your feed

Extra: Cool Git Stuff

`lazygit`

- A terminal UI for using Git.
- Nice if you're a touch-typer.
- Other alternatives to GitHub Desktop: GitKraken, `gitui`, VSCode intergration...

The magic of `bisect`

`git bisect` is actually overpowered...

https://www.youtube.com/watch?v=P3ZR_s3NFvM

Keeping code tidy with `pre-commit`

- `pre-commit` is a tool that ensures certain checks on your file pass before a commit is accepted.
- This could be a linting tool.

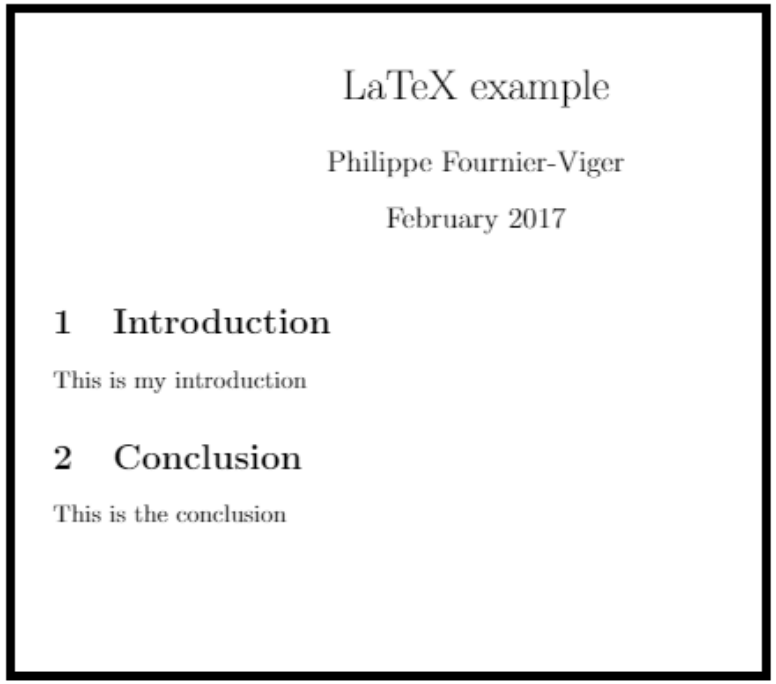
Keeping track of documents with Git

Example.tex

```
\documentclass{article}
\usepackage[utf8]{inputenc}

\title{LaTeX example}
\author{Philippe Fournier-Viger}
\date{February 2017}


\begin{document}

\maketitle

\section{Introduction}
This is my introduction

\section{Conclusion}
This is the conclusion

\end{document}
```

LaTeX

Example.pdf



LaTeX is comfy.

Author	Commit	Message	Date
ucapdak	55130c8	losing my sanity	2018-08-16
ucapdak	b4820bd	fucccccccckkkkkkkkkkkk	2018-08-16
ucapdak	88399e2	fuck	2018-08-16
ucapdak	6a569b7	fixing things up	2018-08-16
ucapdak	ec8f960	lit review okay I guess	2018-08-16
ucapdak	c3408cc	leveled up report	2018-08-16
ucapdak	9241d2c	geez	2018-08-16
ucapdak	f01cac4	More for lit review	2018-08-15
ucapdak	a11a831	exact plot consistency	2018-08-15
ucapdak	2be4146	recipes reference	2018-08-15

Slides: bit.ly/3MPYIWu

Creative Technology Lab: github.com/creativetechnologylab