

Computers and Fluids Discussion Group

How to Git Gud:
Using version control software to help write code

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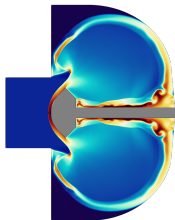
About me:

I am Nick Gibbons:

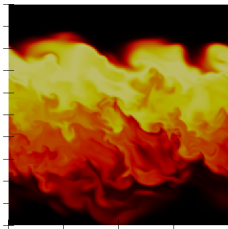
- ▶ Centre for Hypersonics Alumnus (PhD in 2019)
- ▶ Postdoctoral fellow since mid-2020
- ▶ Core developer of hypersonics code Eilmer

Things I do:

CFD Code Dev



HPC Simulations



ARPG Challenge Runs



Today's Talk: Developing with git

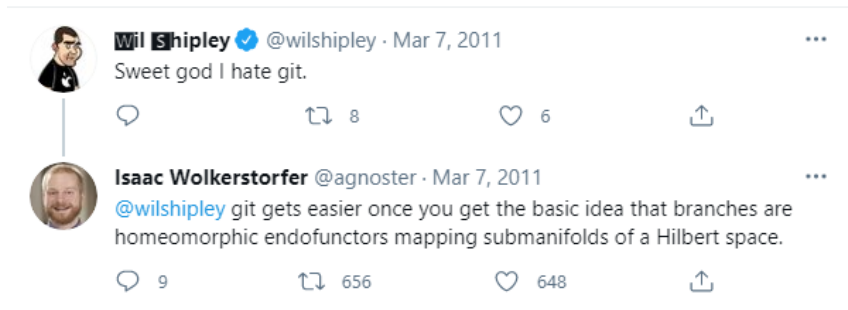


Figure 1: xkcd.com/1597/

Today's Talk: Developing with git

Git is a complicated and sometimes baffling piece of software

- ▶ The source code for Git refers to the program as "the information manager from hell".



Today's Talk: Developing with git

Once you get used to using it though, there's no going back:

- ▶ Thinking of your code as a series of saved checkpoints
- ▶ Instant access to "What have I changed?"
- ▶ Turbocharged debugging and testing

"Developing with git as opposed to without it, is like the difference between climbing a mountain with a safety rope and without one."

- Kyle Damm

Today's Talk: Developing with git

Outline:

- ▶ What is git and where did it come from?
- ▶ How to develop with git: Commands and terminology
- ▶ Live Demo (This bit is going to be spicy)
- ▶ Discussion

What is git anyway?

"Git is a distributed version control system that tracks changes in any set of computer files, usually used for coordinating work among programmers who are collaboratively developing source code during software development."

- en.wikipedia.org/wiki/Git

Key ideas:

- ▶ Git is both a repository: A history of every change ever made to a code
- ▶ And an integration toolkit: a way of combining work from multiple developers

A bit of history?

- ▶ Git was originally developed by Linus Torvalds (of Linux fame) in 2005
- ▶ Other DVCS were clunky or too slow for Linux kernel development

Naming [\[edit \]](#)

Torvalds sarcastically quipped about the name *git* (which means "unpleasant person" in [British English](#) slang): "I'm an egotistical bastard, and I name all my projects after myself. First '[Linux](#)', now 'git'."^{[31][32]} The [man page](#) describes Git as "the stupid content tracker".^[33] The [read-me file](#) of the source code elaborates further:^[34]

"git" can mean anything, depending on your mood.

Figure 2: en.wikipedia.org/wiki/Git

A bit of history?

- ▶ Eilmer was originally controlled using Mercurial
- ▶ Migration to github spurred switch to git in Early 2020
- ▶ Bit of a learning curve initially, for everyone

```
commit 94545d676a2ded4b84fba46a5fec7231f18ec400
Author: Peter Jacobs <peterj@mech.uq.edu.au>
Date:   Sat Feb 1 13:27:52 2020 +1000
```

Small commit to try the git workflow.

Key Terminology

Commit:

- ▶ A saved blob of data representing the state of the entire repo

HEAD:

- ▶ The commit that the files are currently set to

Branch:

- ▶ A label attached to a specific commit

Tracked file:

- ▶ A label attached to a specific commit

Useful Commands for Development

```
$ git status
```

- Summarise repo state, including changed files

Useful Commands for Development

```
$ git diff
```

- Show the changes we've made to the current commit

Useful Commands for Development

```
$ git log --all --graph
```

- Show history of commits

I actually use this .gitconfig alias:

```
[alias]
prettylog = log --graph --abbrev-commit --decorate --format=format:'%C(bold blue)%h%C(reset) \
- %C(bold green)(%ar)%C(reset) %C(white)%s%C(reset) %C(dim white)\
- %an%C(reset)%C(bold yellow)%d%C(reset)' --all
```

Useful Commands for Development

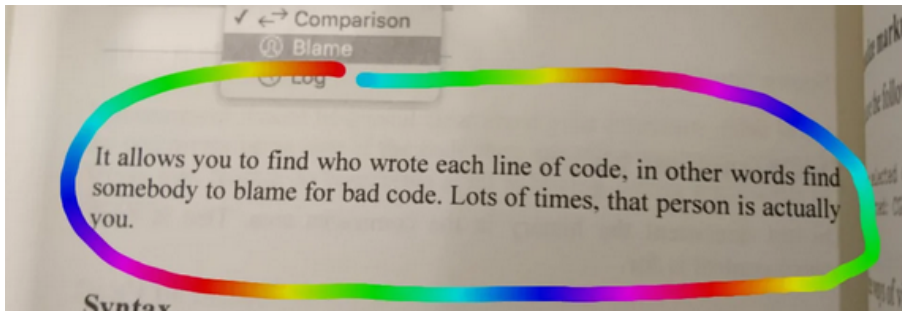
```
$ git stash
```

- ▶ Temporarily save your changes, without affecting the repo state

Useful Commands for Development

\$ git blame

- Show when each line of a file was last changed, and by whom



Useful Commands for Development

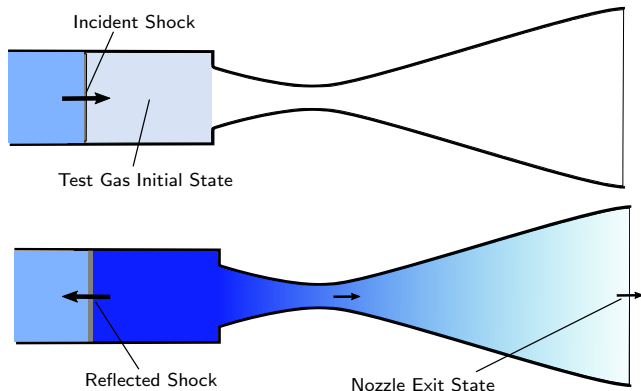
```
$ git checkout -- filename.d
```

- ▶ Reset the state of filename.d to have no changes

Demo: Fixing a bug in nenzf1d

nenzf1d is a program for quickly analysing shock tunnel experiments:

- ▶ My initial plan for this demo was to add a small extra feature
- ▶ Several hours of debugging later, I discovered multiple issues...



Discussion and Questions: Other uses?



Figure 3: www.nasserjunior.com