

~~Python Package Finesse~~ Development

An introduction

Goals: leveling up

1. Make a conscious choice for an IDE/text editor (preferably not jupyterlab)
2. Get (a little more) comfortable with git
3. Knowing where to find the Finesse source and how to navigate it
4. Install and use development/experimental version of Finesse
5. Add feedback to a Finesse merge request
6. Propose a change to Finesse via a merge request



Contents

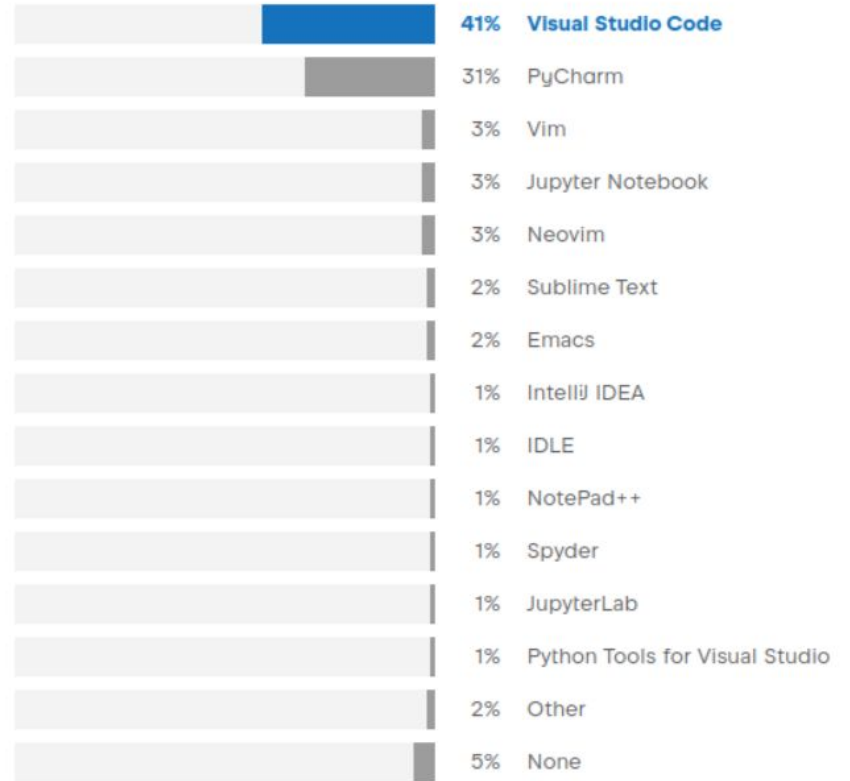
- Editor/IDE
- Part 1
 - Git Quiz! (5-10 min)
 - Brief git primer (5 min) (handout cheatsheets)
 - Git Testdrive repo (15 min)
 - Cloning Finesse and looking around (15 min)
- Coffee break with Finesse Snack
- Part 2
 - Installing development finesse (10 min)
 - Switching between branches (5 min)
 - Make your own change! (20 min)
 - A look at gitlab MRs (10 min)
- Coffee break & continue or end?

Editor/IDE

- Terminal based: vim/emacs/nano
- Notepad
- Sublime
- VSCode
- PyCharm
- JupyterLab

How popular are these?

Main IDE/Editor

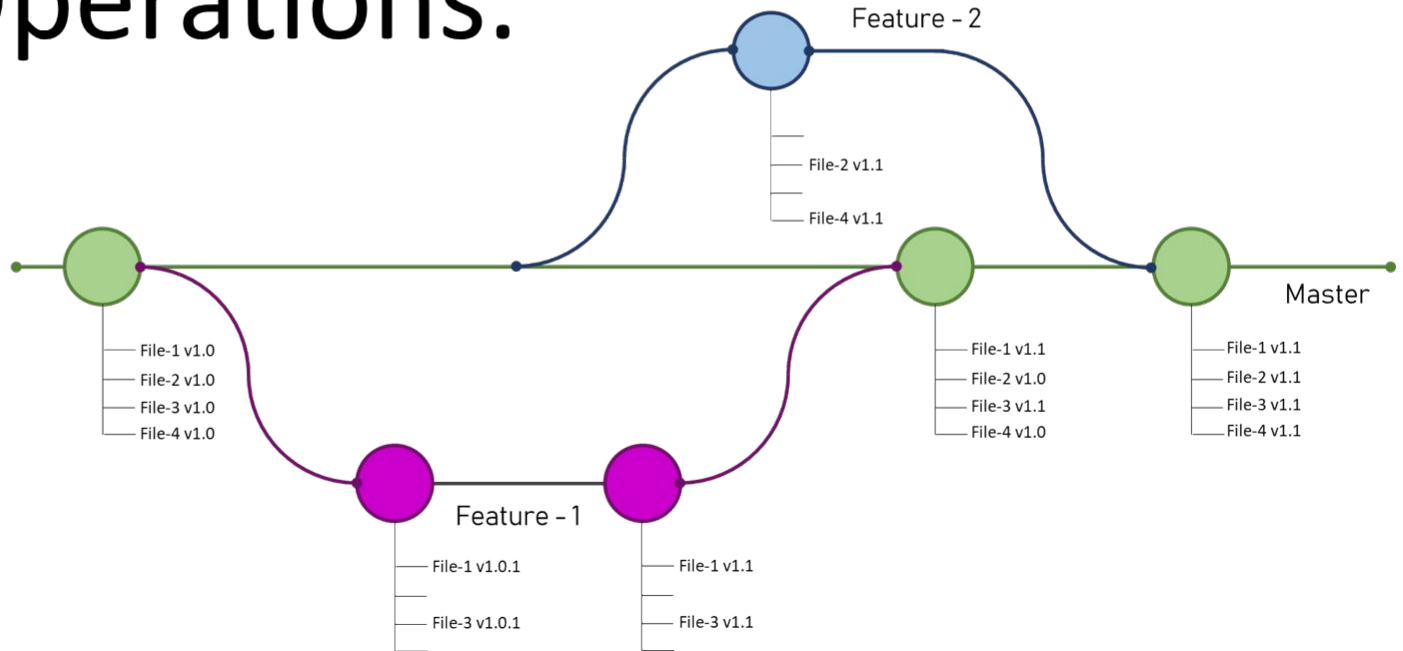


Git quiz!

https://classquiz.de/practice?quiz_id=06d7531a-15a0-43dc-950b-bfadbcdf1e54



GIT Branch and its Operations.



Git

- Don't be scared!
- Stay away from `rebase` and `--force`
- Nothing is ever lost*
- read-only: `git checkout` and `git pull`
- writing: `git checkout -b`, `git add`, `git commit`, `git push`

Play with test repository (15 min)

<https://gitlab.com/mkolk/fdev-playground>

- Instructions are in the repo
- Some 'simple' exercises
- If you already know this, help out someone else or try something complicated like `git bisect` or `git rebase -i`

Getting the finesse source code

If you added an ssh key to your gitlab account

- `git clone git@gitlab.com:infosim/finesse/finesse3.git`

If you don't have the ssh key setup (will ask for password eventually)

- `git clone https://gitlab.com/infosim/finesse/finesse3.git`

Finesse repository

Name	Last commit	Last update			
📁 .gitlab	Add a changelog	2 months ago	📄 CHANGELOG.rst	Drop Python 3.9 support	1 week ago
📁 docker	Add docker setup for cyth...	11 months ago	📄 COPYRIGHT	Add copyright back to a n...	2 years ago
📁 docs	Utility function to generat...	1 week ago	📄 GPL3.txt	Add GPL3 file	5 years ago
📁 playground/graphs	Simulation refactoring an...	7 months ago	📄 LICENSE.md	fix renaming issue	2 years ago
📁 scripts	Feature/generate conda fi...	4 months ago	📄 MANIFEST.in	missing manifest entry w...	7 months ago
📁 src	fix errors	1 week ago	📄 Makefile	Fix makefile to properly c...	6 months ago
📁 tests	fixes #666 DCFieldsSoluti...	1 week ago	📄 README.md	more repo and doc url ch...	2 years ago
📄 .azure.yml	Feature/602 create setup ...	10 months ago	📄 environment-win....	Utility function to generat...	1 week ago
🔖 .gitignore	Add FrequencyResponse...	6 months ago	📄 environment.yml	Utility function to generat...	1 week ago
🔥 .gitlab-ci.yml	Drop Python 3.9 support	1 week ago	📄 make.bat	redirect for make command	3 years ago
📄 .pre-commit-conf...	Feature/generate conda fi...	4 months ago	📄 pyproject.toml	Drop Python 3.9 support	1 week ago
📄 .reslate-config.ya...	Implemented fully automa...	4 years ago	📄 setup.py	Changing sets to Ordered...	2 months ago
			📄 tox.ini	Clean up project configur...	9 months ago

You should only care about these*

Name	Last commit	Last update
gitlab	Add changelog	8 months ago
docker	Add docker setup for python	11 months ago
docs	Utility function to generat...	1 week ago
docs/figures/grahbs	Simulation refactoring and...	7 months ago
scripts	Feature/generate conda n...	4 months ago
src	fix errors	1 week ago
tests	fixes #666 DCFieldsSoluti...	1 week ago
environment.vml	Feature/602 create setup	10 months ago
.gitignore	Add Frequency Response...	8 months ago
gitlab-ci.yml	Drop Python 3.9 support	1 week ago
pre-commit-confi...	Feature/generate conda n...	4 months ago
reslate-config.py	Implemented fully	6 years ago

CHANGELOG.rst	Drop Python 3.9 support	1 week ago
COPYRIGHT	Add copyright back to main	2 years ago
CPL3.txt	Add CPL3 file	5 years ago
LICENSE.md	fix renaming issue	2 years ago
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README.md	more repo and doc art ch...	2 years ago
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Let's look at the source

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The source (src/finesse)

Types of files:

- .rst
- .py
- .pyx
- .pyd
- .c
- .h
- .so / .dylib / .pyd

```
finesse
├── analysis
│   └── actions
├── cli
├── components
│   └── modal
├── cymath
├── detectors
│   └── compute
├── graph
├── knm
├── ligo
├── plotting
│   └── style
├── script
├── simulations
│   ├── graph
│   └── sparse
├── solutions
├── thermal
├── tracing
├── utilities
└── virgo
```

The source

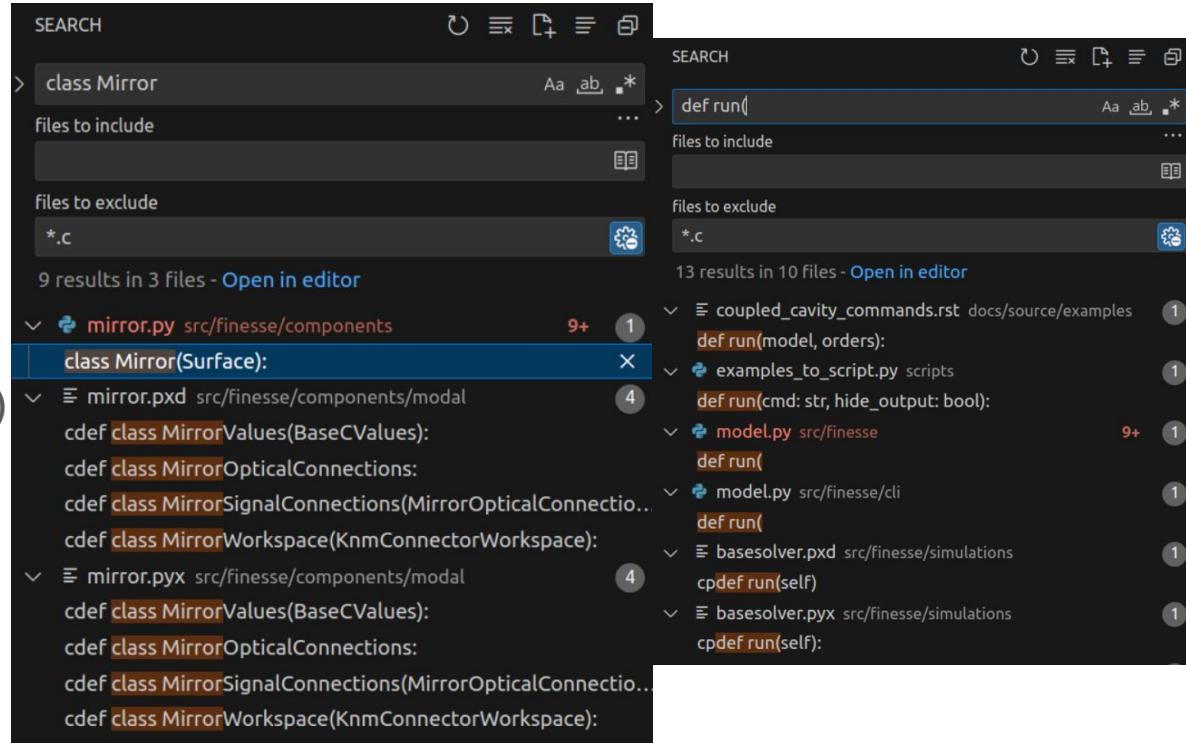
Types of files:

- .rst -> documentation file
- .py -> regular python file
- .pyx -> cython source file
- .pyd -> cython 'headers' file
- .c -> c source file
- .h -> c header file
- .so / .dylib / .pyd -> compiled cython file

```
finesse
├── analysis
│   └── actions
├── cli
├── components
│   └── modal
├── cymath
├── detectors
│   └── compute
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│   ├── graph
│   └── sparse
├── solutions
├── thermal
├── tracing
├── utilities
└── virgo
```

How to find stuff?

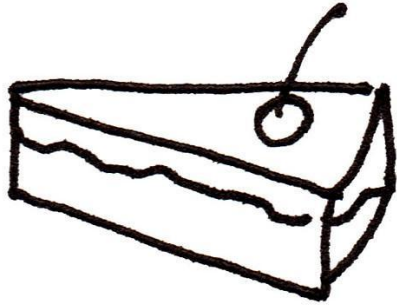
- Use your IDE search function!
- Classes (components, actions) -> 'class Name'
- Functions (anything else) -> 'def Name'



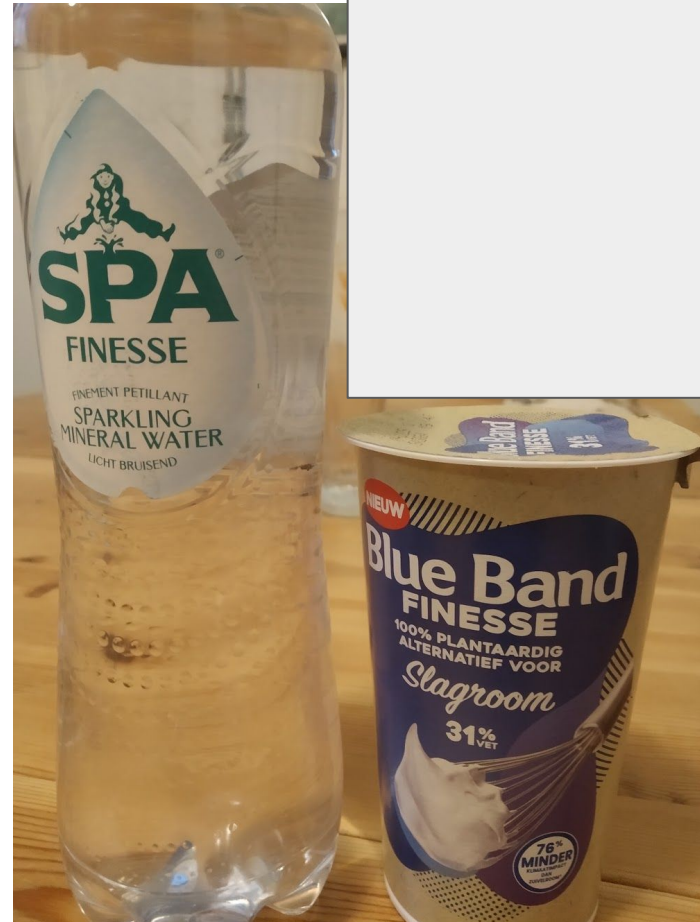
Code source questions (10 min)

- What does the `Model.disconnect` method do?
- How many components are in Finesse? (hint: these are classes)
- What does the `NoiseProjection` action do?
- Where is the optical equations for the mirror defined (ignore 'optical equations', look for matrix filling code)

Cake break!



Take a break



Conda Environment

- Conda -> [miniforge](#)
- [Use only the conda-forge channel](#)
- Separate environments for 'development' and 'normal usage'!
- If you are confused:
 - In a notebook/script: `print(finesse.__version__)`:
 - `3.0a29` (normal version)
 - `3.0a30.dev7+gf443591ea.d20241127` (develop version)
 - In terminal: `conda list | grep finesse`
 - `finesse 3.0a30.dev9+g17be4456 pypi_0 pypi`
 - `finesse 3.0a29 py312h15d00b7_0 conda-forge`

Installing Finesse from source

```
git clone git@gitlab.com:ifosim/finesse/finesse3.git  
cd finesse3  
conda create -n finesse-develop  
conda activate finesse-develop  
conda env update -f environment.yml  
pip install -e . --no-build-isolation --no-deps  
python -c 'import finesse'
```

Switching branches

Existing branch/tag

- `git checkout <branch/tag>` and make

Make a new local branch

- `git checkout -b branchname`

Let's try making some changes!

- Modify `finesse.model.Model.run` such that it prints 'Finesse is amazing' everytime you run a simulation.
- Change the default laser power to 5 watts
- Add a third port to the Mirror component

Optional extras

- Look at / create a gitlab merge request
 - Create a merge request in the [playground repo](#)
 - Take a look at existing [merge requests](#)
- Running / writing a test
 - Try running the test suite with the `pytest` command
 - Try writing a new test in the finesse repo (see [pytest docs](#))
 - Try running a test through the debugger
- IDE:
 - Figure out how to run an interactive debugger in your IDE and step through some Finesse code (vscode instructions: <https://code.visualstudio.com/docs/editor/debugging> and https://code.visualstudio.com/docs/python/debugging#_basic-debugging)
- Documentation pages:
 - Try following the [developer documentation](#) and edit/create a page