

Contribution Workflow

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CONTRIBUTING.md

Contributing

For candidates interested in participating in the Google Summer of Code (GSoC), checkout Mesa's [GSoC guide](#).

As an open source project, Mesa welcomes contributions of many forms, and from beginners to experts. If you are curious or just want to see what is happening, we post our development session agendas and development session notes on [Mesa discussions](#). We also have a threaded discussion forum on [Matrix](#) for casual conversation.

In no particular order, examples include:

- Code patches
- Bug reports and patch reviews
- New features
- Documentation improvements
- Tutorials

No contribution is too small. Although, contributions can be too big, so let's discuss via [Matrix](#) OR via [an issue](#).

To submit a contribution

- Create a ticket for the item that you are working on.
- Fork the Mesa repository.
- [Clone your repository](#) from Github to your machine.
- Create a new branch in your fork: `git checkout -b BRANCH_NAME`
- Run `git config pull.rebase true`. This prevents messy merge commits when updating your branch on top of Mesa main branch.
- Install an editable version with developer requirements locally: `pip install -e ".[dev]"`
- Edit the code. Save.
- Git add the new files and files with changes: `git add FILE_NAME`
- Git commit your changes with a meaningful message: `git commit -m "Fix issue X"`
- If implementing a new feature, include some documentation in docs folder.
- Make sure that your submission works with a few of the examples in the examples repository. If adding a new feature to mesa, please illustrate usage by implementing it in an example.
- Make sure that your submission passes the [GH Actions build](#). See "Testing and Standards below" to be able to run these locally.

<https://github.com/mesa/mesa/blob/main/CONTRIBUTING.md>

Modeller and/or developer

I'm a modeller (but not an experienced developer)

You already know how to build Mesa models (if not skip below), and probably have found things Mesa can't do (elegantly). You want to improve that. Awesome!

First step is to install some proper tools, if you haven't already.

- A good IDE helps for code development, testing and formatting. [PyCharm](#) or [VSCode](#) for example.
- Dive into Git and GitHub. Watch some videos, this takes some time to click. [GitHub Desktop](#) is great.
- <https://github.dev/mesa/mesa> is great for small changes (to docs).

Learn the tools, talk to us about what you want to change, and open a small PR. Or update an [example model](#) (check open [issues](#)!).

<https://github.com/mesa/mesa/blob/main/CONTRIBUTING.md>

I'm a developer (but not a modeller)

Awesome! You have the basics of open-source software development (if not check above), but not much modelling experience.

First step is to start thinking like a modeller. To understand the fine details about our library and contribute meaningfully, get some modelling experience:

- Go though our series of introductory tutorials at [Getting Started](#). While going through them, dive into the source code to really see what everything does.
- Follow an ABM course (if possible). They might be a bit outdated programming language wise, but conceptual they're sound.
 - This MOOC on ABM concepts: [Agent Based Modeling](#)
 - This MOOC on practical ABM modelling: [Agent-Based Models with Python: An Introduction to Mesa](#)
- Go though multiple of our [examples](#). Play with them, modify things and get a feel for Mesa and ABMs.
 - Check our open [issues](#) for the examples.
 - If you see anything you want to improve, feel free to open a (small) PR!
- If you have a feel for Mesa, check our [discussions](#) and [issues](#).
 - Also go through our [release notes](#) to see what we recently have been working on, and see some examples of successful PRs.
- Once you found or thought of a nice idea, comment on the issue/discussion (or open a new one) and get to work!

Part I: Setup

- Create a ticket for the item that you are working on.
- Fork the Mesa repository.
- Clone your repository from Github to your machine.
- Create a new branch in your fork: `git checkout -b BRANCH_NAME`
- Run `git config pull.rebase true`. This prevents messy merge commits when updating your branch on top of Mesa main branch.
- Install an editable version with developer requirements locally: `pip install -e ".[dev]"`

1.1 Create a ticket (or find one)

The screenshot shows a list of GitHub issues. At the top, there are several filter dropdowns: 'Author', 'Labels' (circled in red), 'Projects', 'Milestones', 'Assignees' (circled in red), 'Types', and 'Newest'. Red arrows point from each of these circled labels to the corresponding section of the interface below. The issues listed include:

- Improper Redirection in Docs
- SolaraViz: Improve Portrayal API
- Tracking issue: Resolve test suite warnings
- Deprecating stdlib random
- ReadtheDocs Section Navigation
- SpaceRenderer question
- Agent icon library
- Missing classes for vizualization
- Error when running Hotelling's Law example

Each issue entry includes a checkbox, a green circular icon, the issue title, labels (e.g., enhancement, visualization, good first issue), the number of comments, and the date it was opened.

1.2 Fork the repository

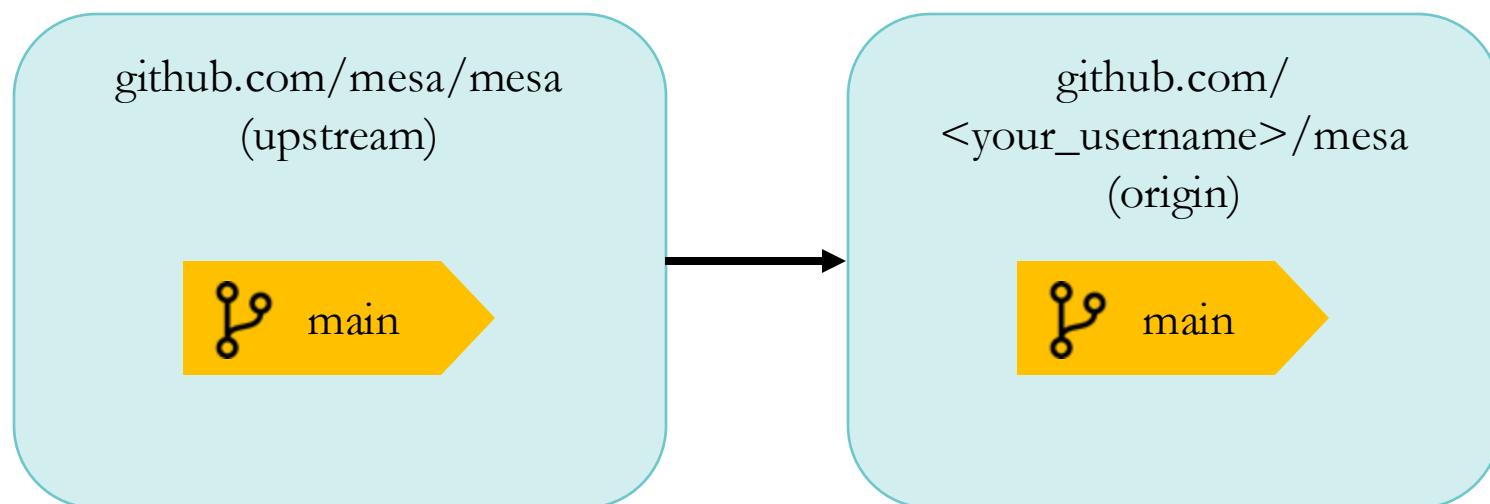
The screenshot shows the GitHub repository page for 'mesa / mesa'. The top navigation bar includes links for Code, Issues (126), Pull requests (38), Discussions, Actions, Projects, Wiki, and Security. Below the navigation is a search bar and a user profile icon. The main content area displays the repository details: 'mesa' (Public), 'Sponsor', 'Edit Pins', 'Unwatch 94', 'Fork 1.1k' (circled in red), 'Star 3.3k', '31 Branches', '67 Tags', and a 'Go to file' search bar. A list of recent commits is shown, including:

- quaquel Fix for Model.reset_rng (#2946) · a320b79 · 2 days ago · 2,828 Commits
- .github Update organization name from pro... · 3 days ago
- benchmarks Benchmarks documentation (#2764) · 7 months ago
- binder Update Binder environment to use l... · 10 months ago
- docs Update organization name from pro... · 3 days ago
- maintenance Update organization name from pro... · 3 days ago
- mesa Fix for Model.reset_rng (#2946) · 2 days ago
- tests Fix for Model.reset_rng (#2946) · 2 days ago
- .coderabbit.yaml Add .coderabbit.yaml file to allow ... · 7 months ago
- .codespellignore Add module-level docstring to expe... · last year
- .coveragerc Implement simpler Mesa namespace · 3 years ago

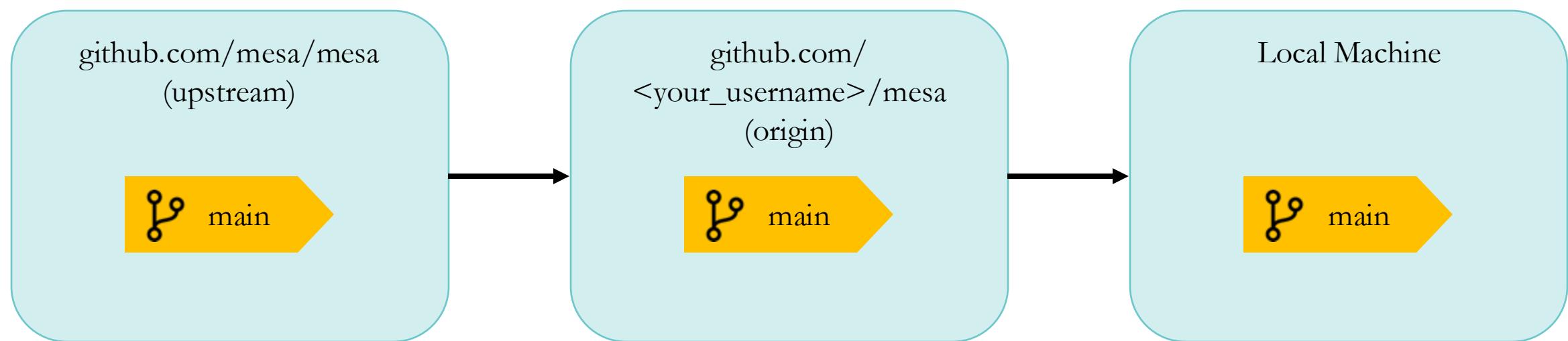
The right sidebar contains sections for 'About', 'mesa.readthedocs.io', and various documentation links.

1.2 Fork the repository

After forking, there are now **two** GitHub repos: upstream (Mesa) and your fork.



1.3 Clone to local machine



1.3 Clone to local machine

```
$ git remote -v  
origin  https://github.com/<your_username>/mesa.git (fetch)  
origin  https://github.com/<your_username>/mesa.git (push)
```

Local Machine



1.3 Clone to local machine

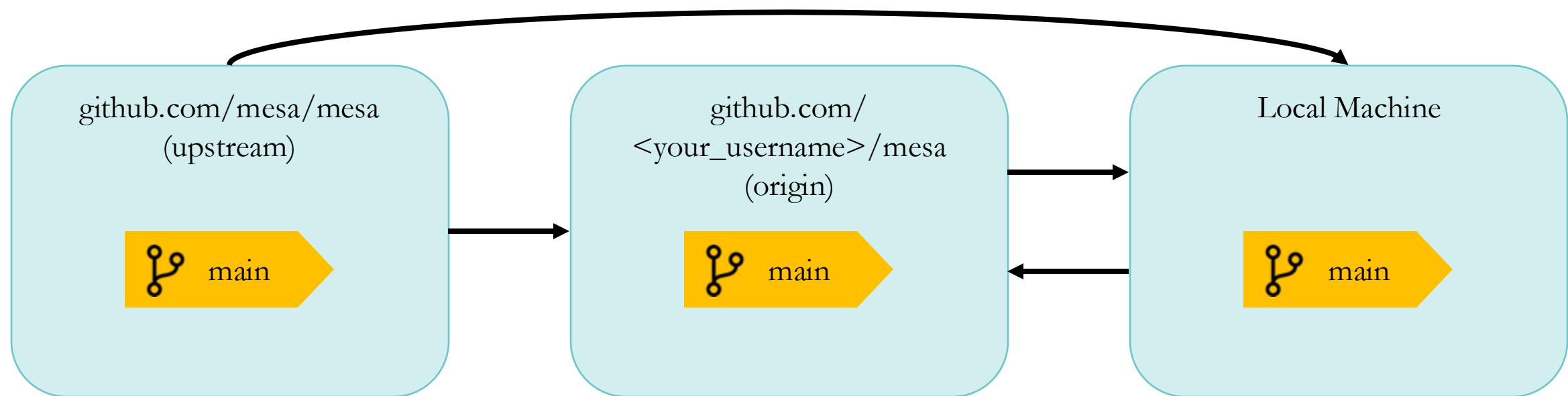
Optionally add upstream remote to pull latest from Mesa:

```
$ git remote add upstream https://github.com/mesa/mesa  
$ git remote -v  
origin  https://github.com/<your_username>/mesa.git (fetch)  
origin  https://github.com/<your_username>/mesa.git (push)  
upstream      https://github.com/mesa/mesa (fetch)  
upstream      https://github.com/mesa/mesa (push)
```

Local Machine



1.3 Clone to local machine



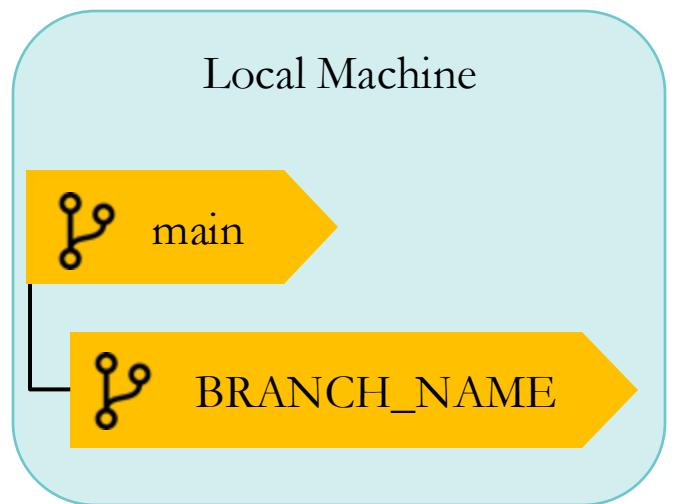
1.4 Create a branch

For clear history:

```
$ git config pull.rebase true
```

To isolate your work:

```
$ git checkout -b BRANCH_NAME
```



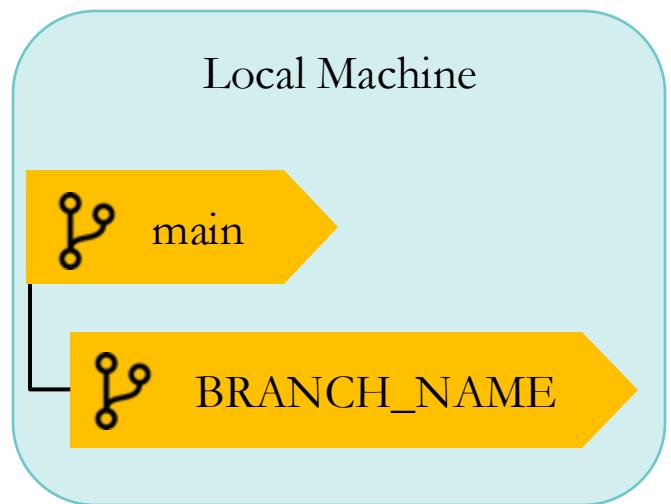
1.5 Install dev dependencies

Create a virtual environment (using venv as example):

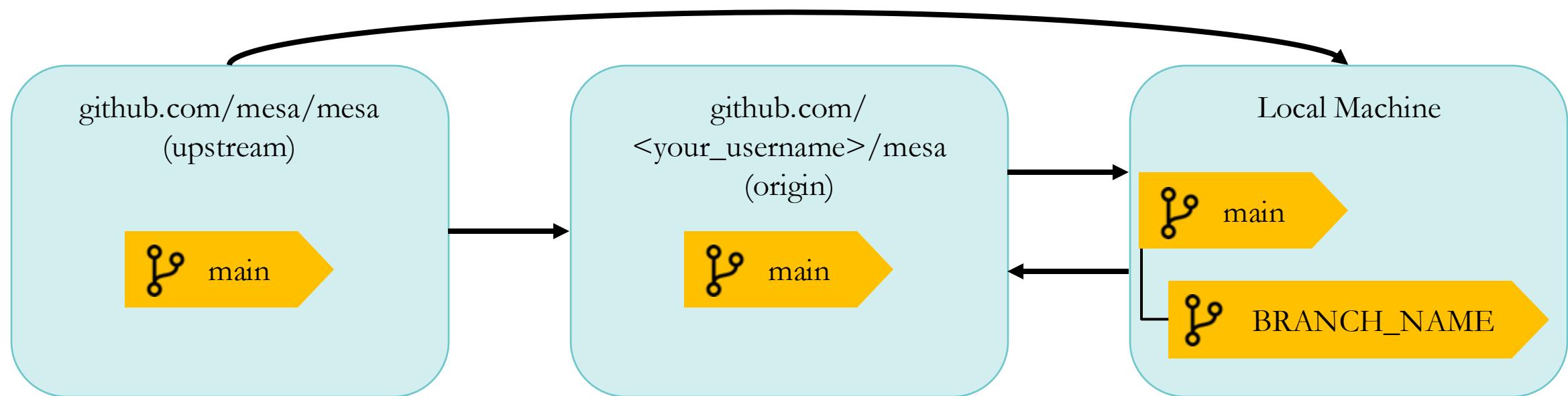
```
$ python3 -m venv .venv  
$ source .venv/bin/activate
```

Install development dependencies:

```
$ pip install -e ".[dev]"
```



Part I: Setup



Part II: Development

- Edit the code. Save.
- Git add the new files and files with changes: `git add FILE_NAME`
- Git commit your changes with a meaningful message: `git commit -m "Fix issue X"`
- If implementing a new feature, include some documentation in docs folder.
- Make sure that your submission works with a few of the examples in the examples repository. If adding a new feature to mesa, please illustrate usage by implementing it in an example.
- Make sure that your submission passes the [GH Actions build](#). See "Testing and Standards below" to be able to run these locally.
- Make sure that your code is formatted according to [the black] standard (you can do it via [pre-commit](#)).

2.1 Make changes

- Edit the code. Save.
- If implementing a new feature, include some documentation in docs folder.
- Make sure that your submission works with a few of the examples in the examples repository. If adding a new feature to mesa, please illustrate usage by implementing it in an example.

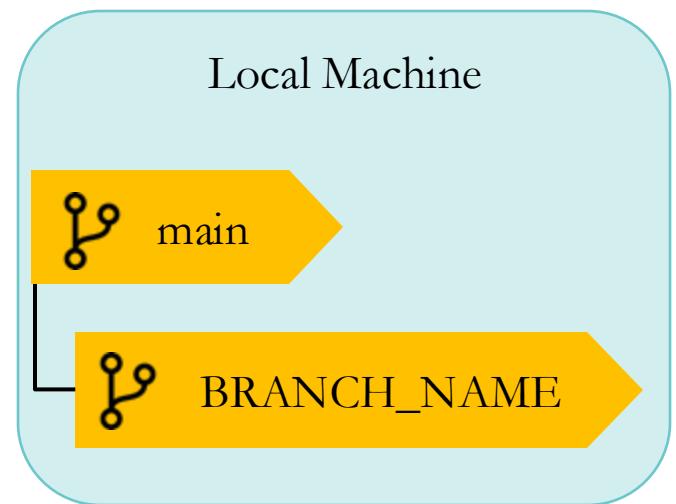
2.2 Add & commit changes

- Git add the new files and files with changes:

```
$ git add FILE_NAME
```

- Git commit your changes with a meaningful message (optionally with the #):

```
$ git commit -m "fix issue #123"
```



2.3 Testing & formatting

Set up pre-commit if it's not available:

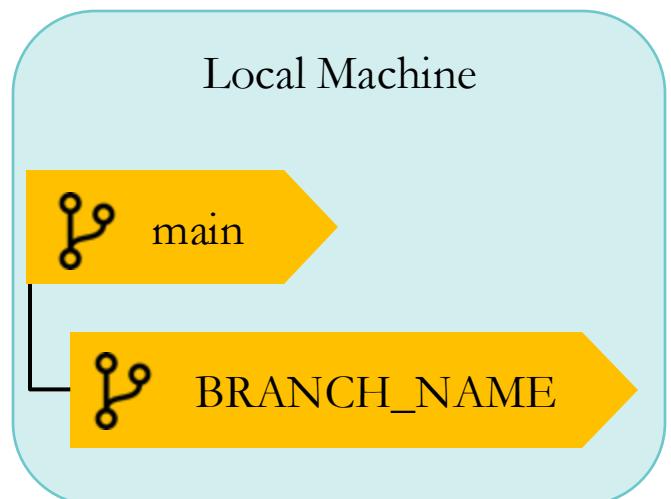
```
$ pip install pre-commit  
$ pre-commit install
```

Run pre-commit (or just ruff) locally:

```
$ pre-commit run --all-files  
$ ruff check . --fix
```

Run tests locally:

```
$ py.test --cov=mesa tests/
```



Note: GitHub will run these checks again via GitHub Actions when you open your PR.

Part II: Development



- Edit the code. Save.
- Git add the new files and files with changes: `git add FILE_NAME`
- Git commit your changes with a meaningful message: `git commit -m "Fix issue X"`
- If implementing a new feature, include some documentation in docs folder.
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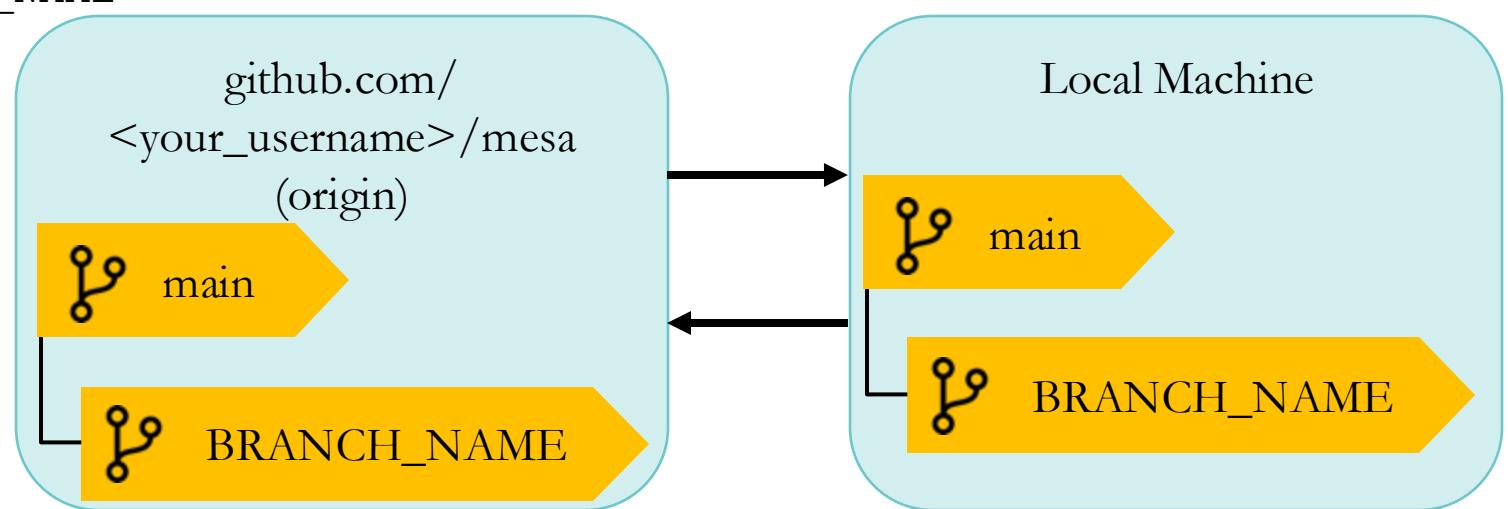
Part III: Submission

- Push your changes to your fork on Github: `git push origin NAME_OF_BRANCH`
- Create a pull request.
- Describe the change w/ ticket number(s) that the code fixes.
- Format your commit message as per [Tim Pope's guideline](#).

3.1 Push to your fork

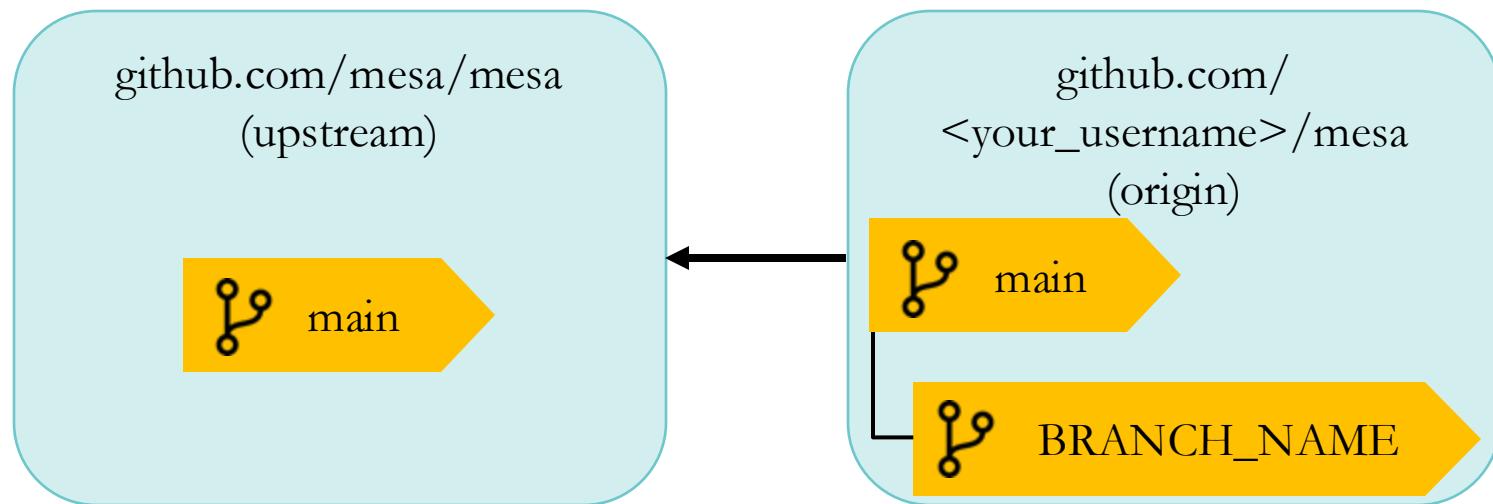
Push your changes to your fork on GitHub:

```
$ git push -u origin BRANCH_NAME
```

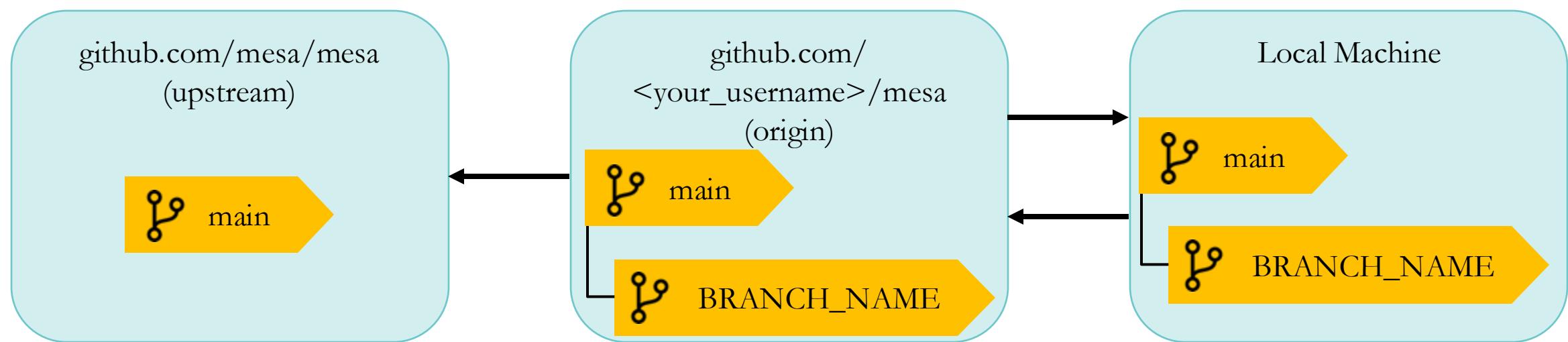


3.2 Create a pull request

On GitHub, propose merging BRANCH_NAME from your fork into Mesa's main branch. Link PR to ticket.



Part III: Submission



Practice tasks

Check the tasks at <https://github.com/abmind-community/contrib-practice>

Task 01: Add yourself

- Practise fork/branching/PR workflow.

Task 02: Fix style

- Use ruff & pre-commit to fix style issues.

Task 03: Add tests

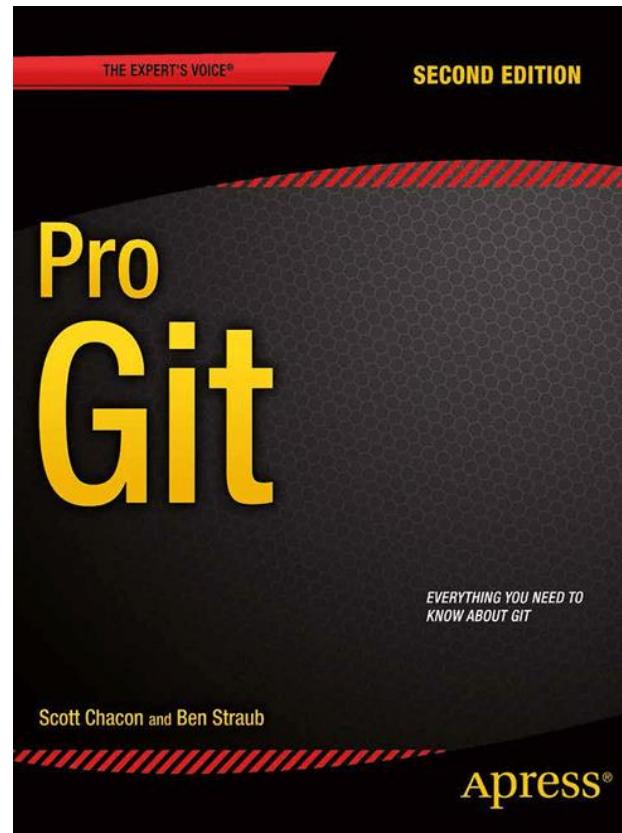
- Write unit tests and update existing PR.

Task 04 & 05: Merge conflict

- Simulate and resolve a basic merge/rebase conflict.

Book

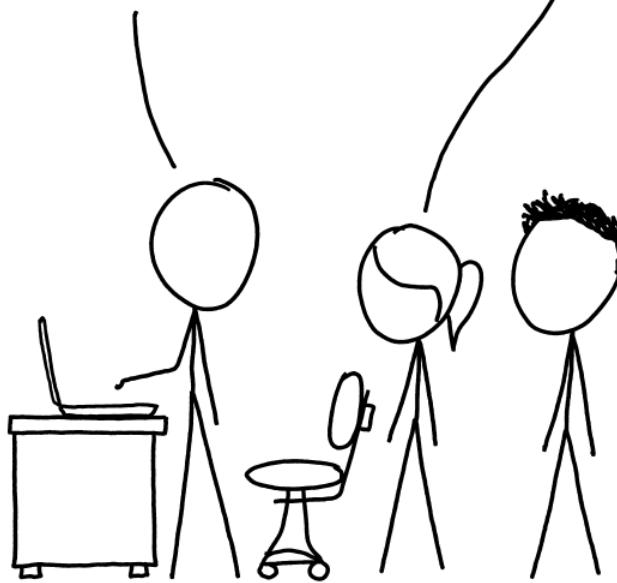
- Available at: <https://git-scm.com/book>
- Chapters 1, 2, 3, 5 & 6.



THIS IS GIT. IT TRACKS COLLABORATIVE WORK
ON PROJECTS THROUGH A BEAUTIFUL
DISTRIBUTED GRAPH THEORY TREE MODEL.

COOL. HOW DO WE USE IT?

NO IDEA. JUST MEMORIZIZE THESE SHELL
COMMANDS AND TYPE THEM TO SYNC UP.
IF YOU GET ERRORS, SAVE YOUR WORK
ELSEWHERE, DELETE THE PROJECT,
AND DOWNLOAD A FRESH COPY.



Source: <https://xkcd.com/1597>