

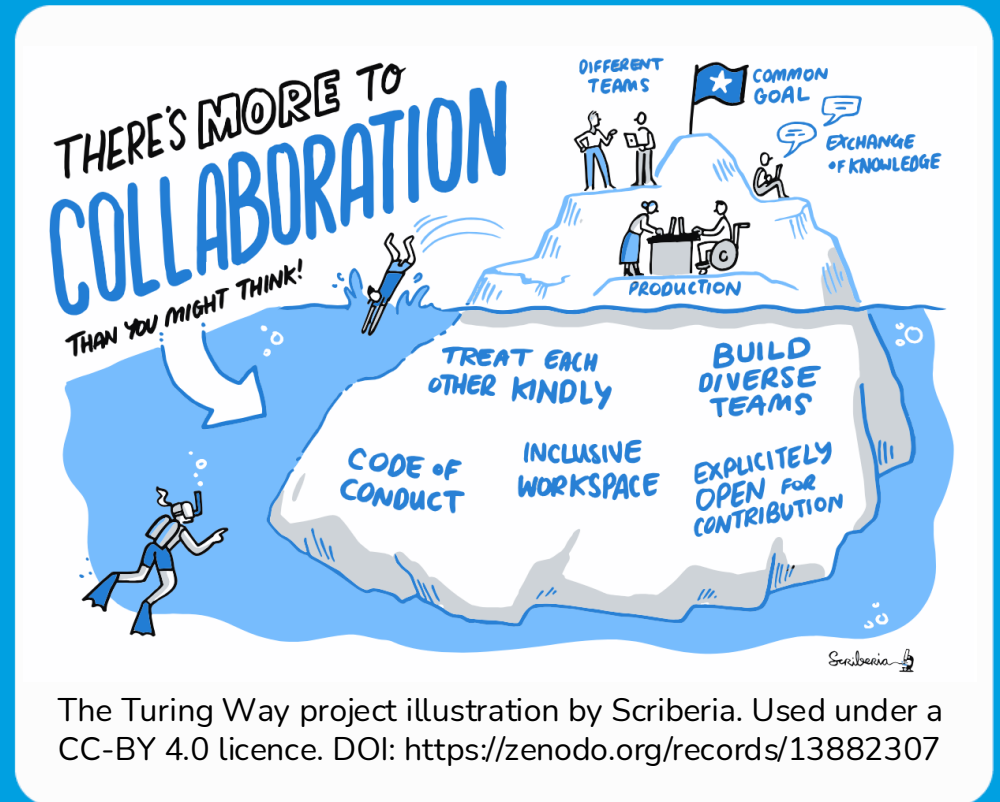
# (Remote) collaborative code development, GitHub collaborative workflow

netherlands  
**eScience** center

Sarah Alidoost, RSE

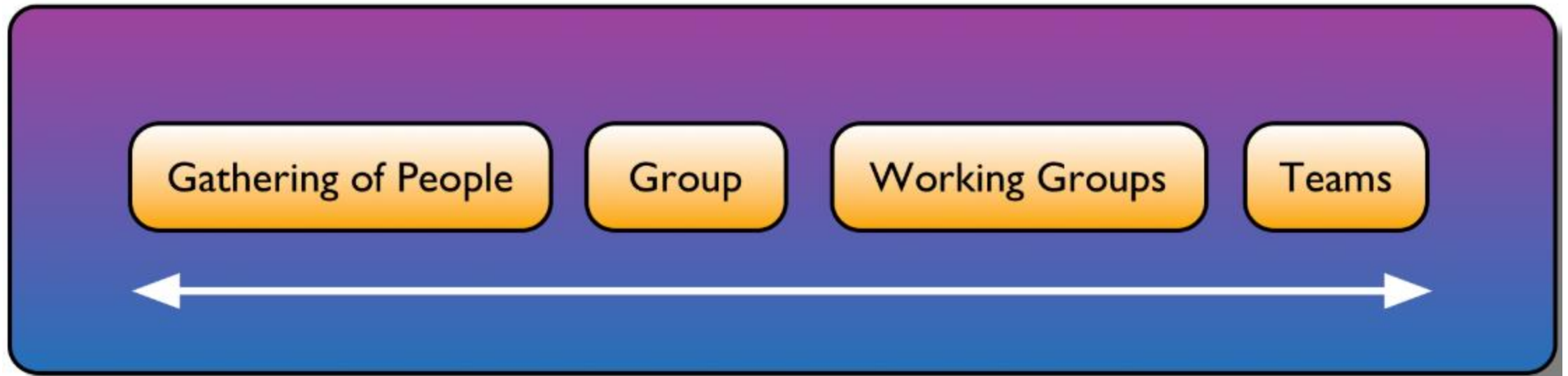
# Collaborative code development

- Teamwork for research software development
- GitHub collaborative workflow
- Remote code development



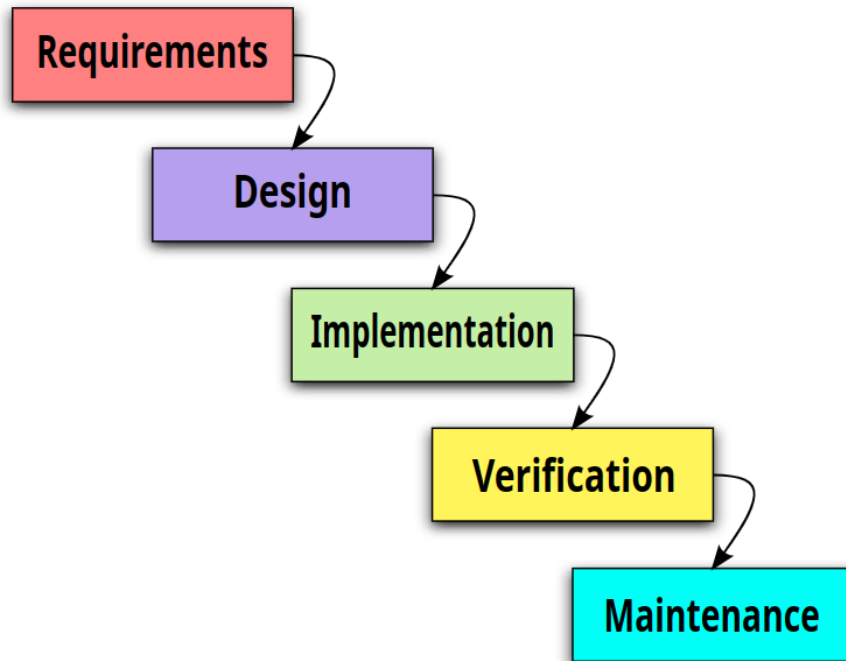
# Teamwork for research software development

Why work in teams?

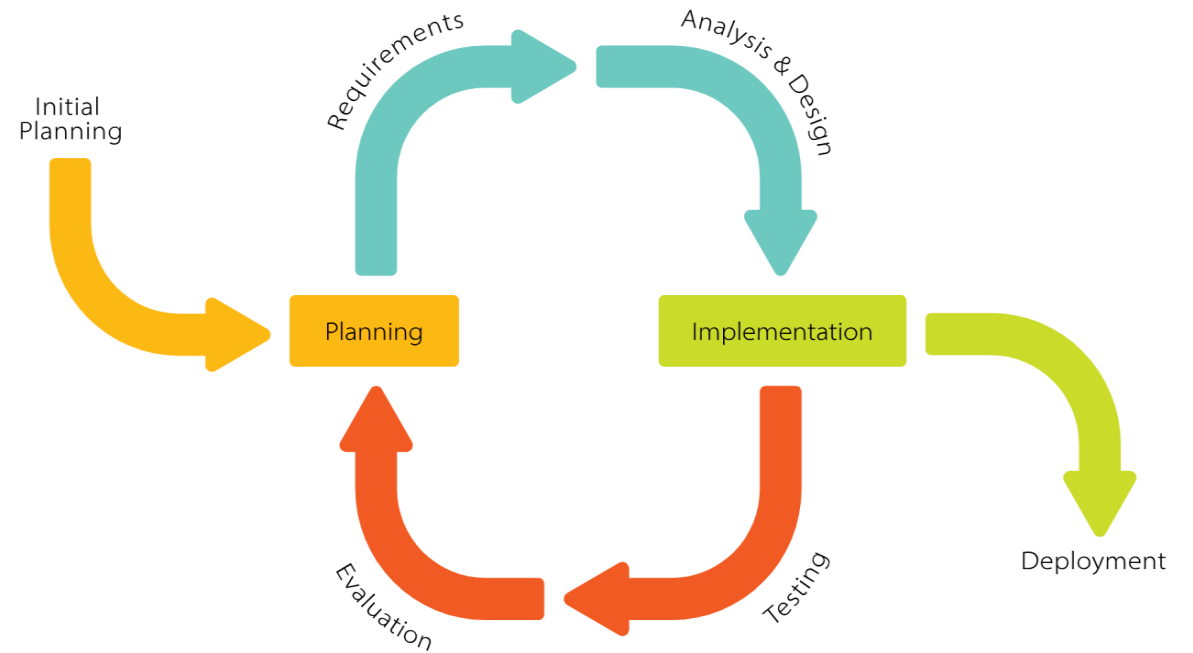


# Teamwork for research software development

How to work in teams?



Waterfall model



vs

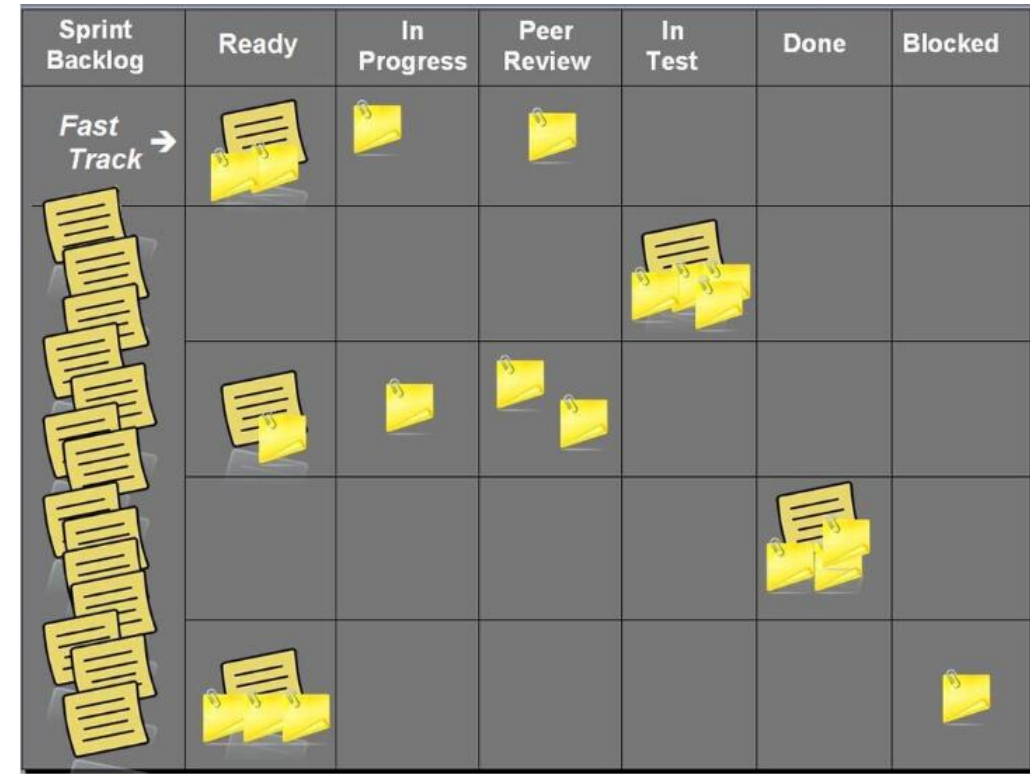
Iterative model

# Teamwork for research software development

How to implement a teamwork?

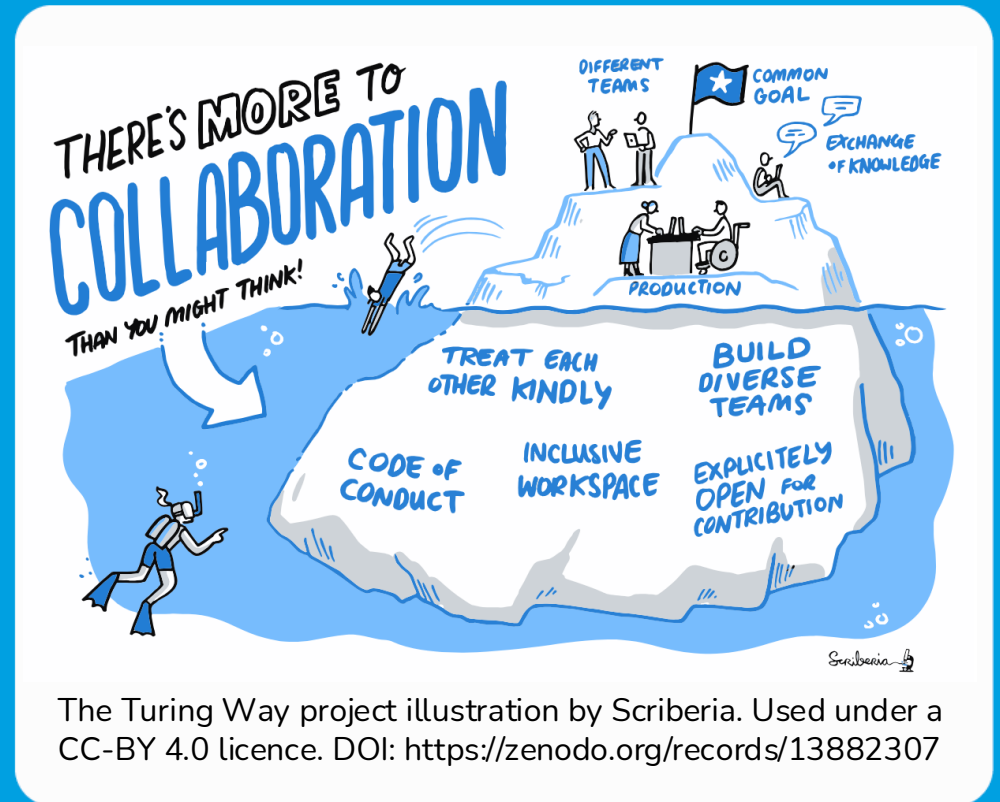
*Common Agile methods: Scrum, Kanban, ScrumBan*

- Initial planning:
  - What?
  - How?
  - Who?
- Organizing meetings: planning, update, review, retro
- Tracking the process:
  - To Do, Doing, Done.
  - To Do, In Progress, Review, Done.
  - To Do, In Progress, Demo, Done.
  - Committed, Analysed, In Progress, Done.
  - Ready, Estimate, Development, Test, Done.



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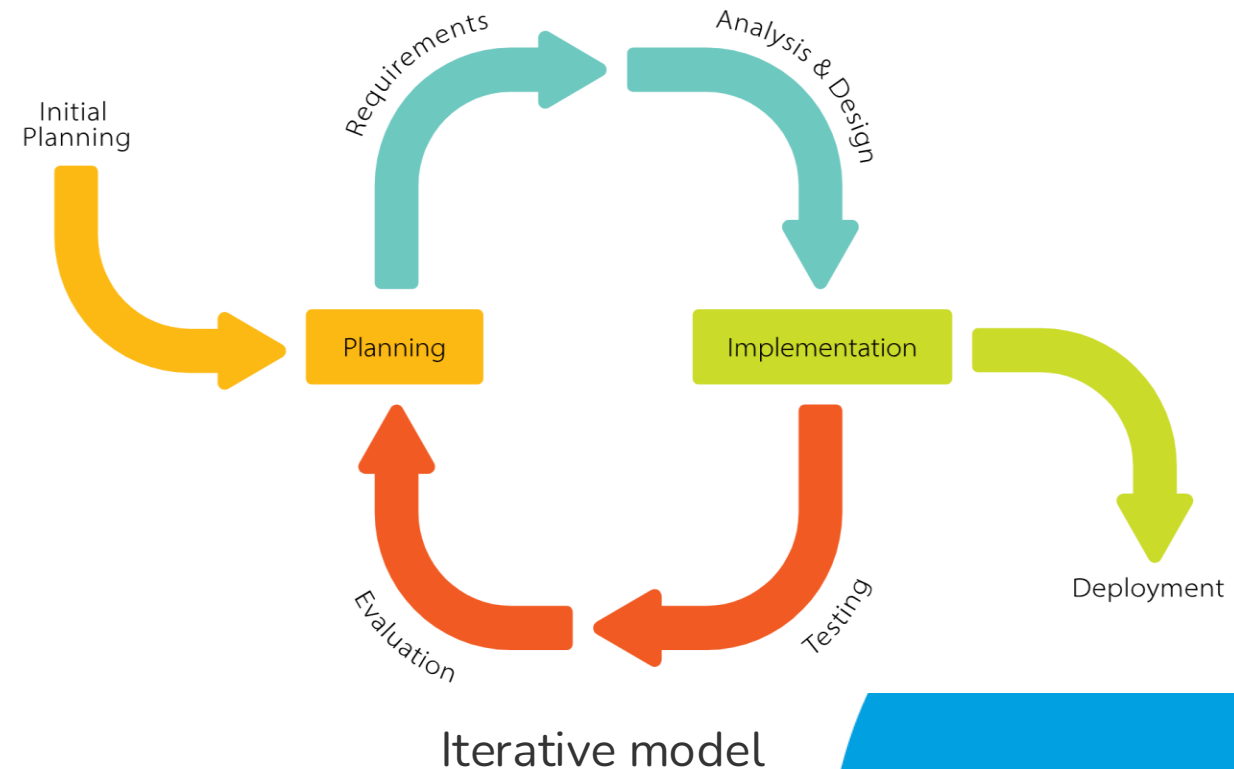


# GitHub collaborative workflow

How to set up a collaborative workflow?

## Initial planning:

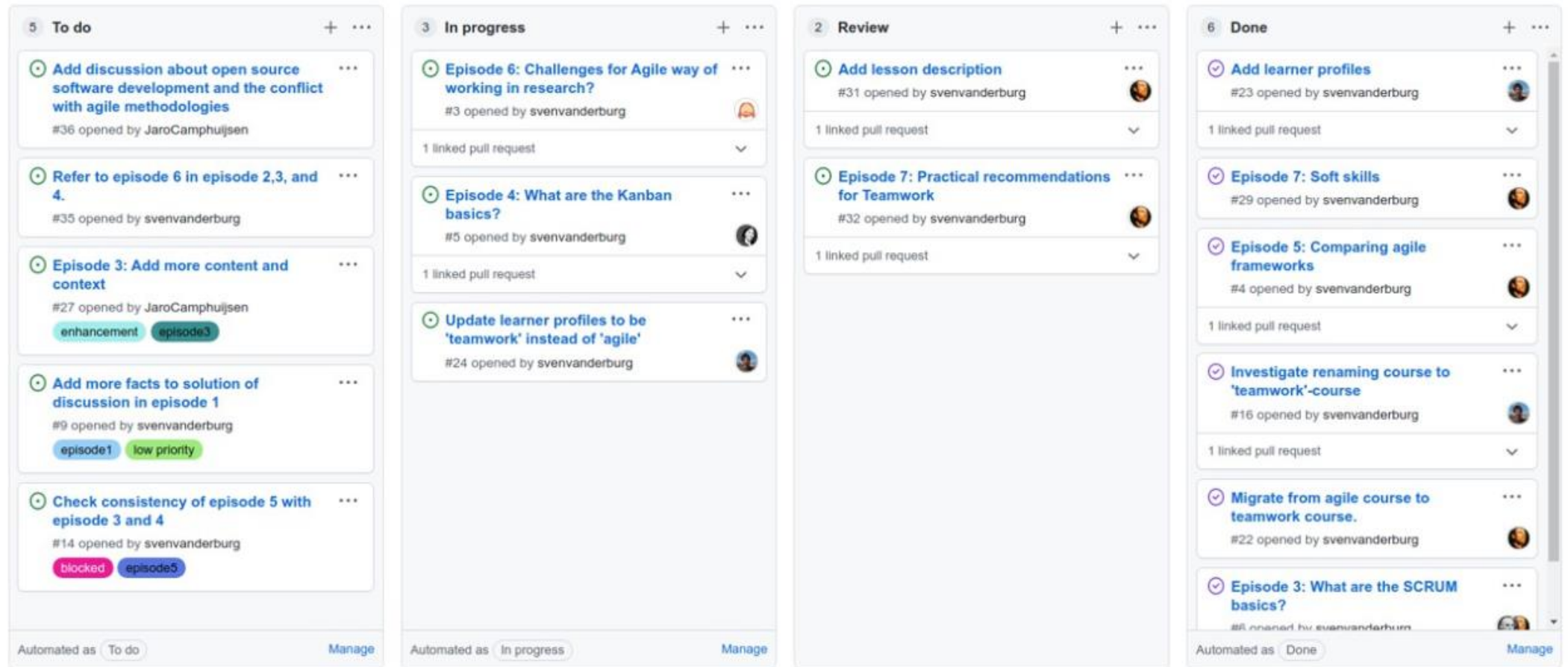
- Create a github repository for each tool
- **Who:** Invite people to the repository
- **What:** Submit issues and sub-issues
- **How:** Setup a project



# GitHub collaborative workflow

Setup a GitHub project?

*Example Agile methods: ScrumBan*



Best practices for Projects

<https://docs.github.com/en/issues/planning-and-tracking-with-projects/learning-about-projects/best-practices-for-projects>

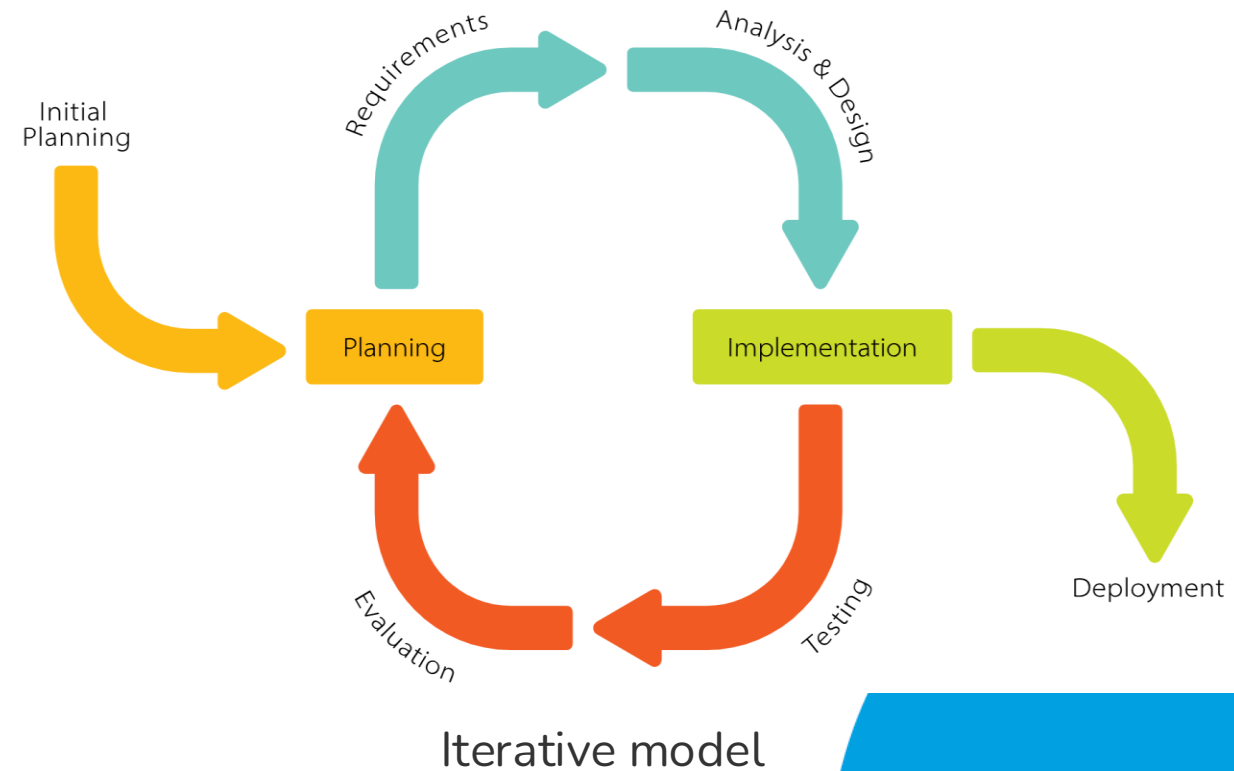


# GitHub collaborative workflow

How to develop code?

## Implementation:

- Continuous Integration
- Update meetings




# GitHub collaborative workflow

Continuous Integration

New issue


Submit/  
pick an  
issue

 main ▼


Create a branch



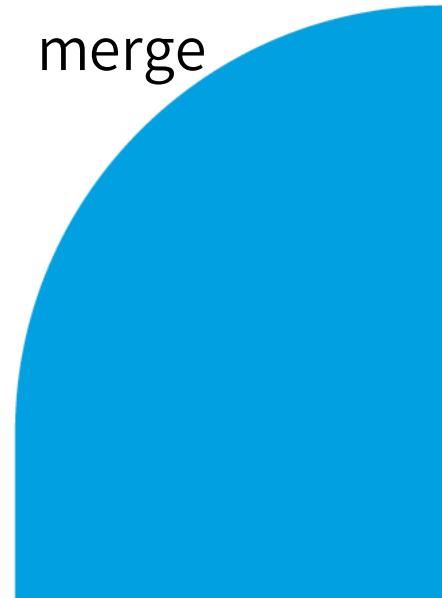
Develop and  
test

 Open

Submit a  
pull request

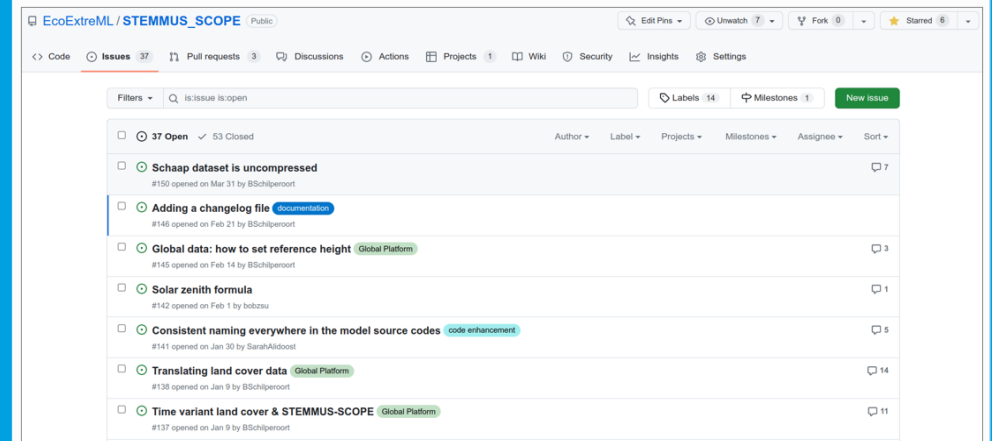
 Merged

Review and  
merge



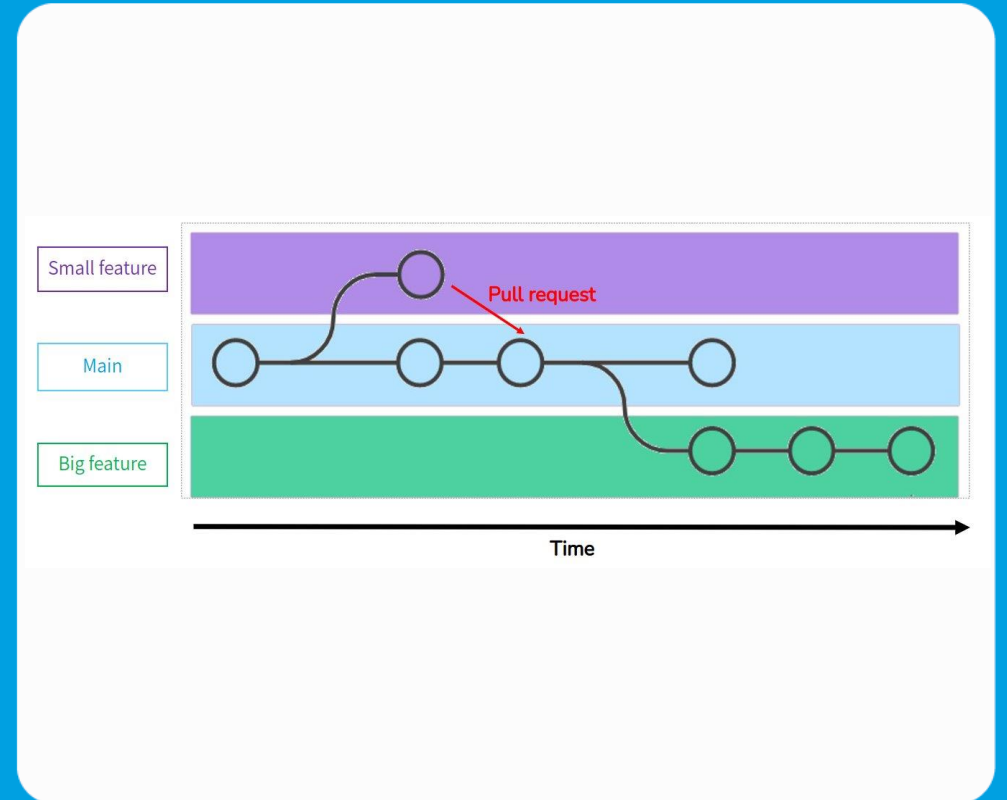
# Submit / pick an issue

- Share ideas
- Ask questions
- Report a bug



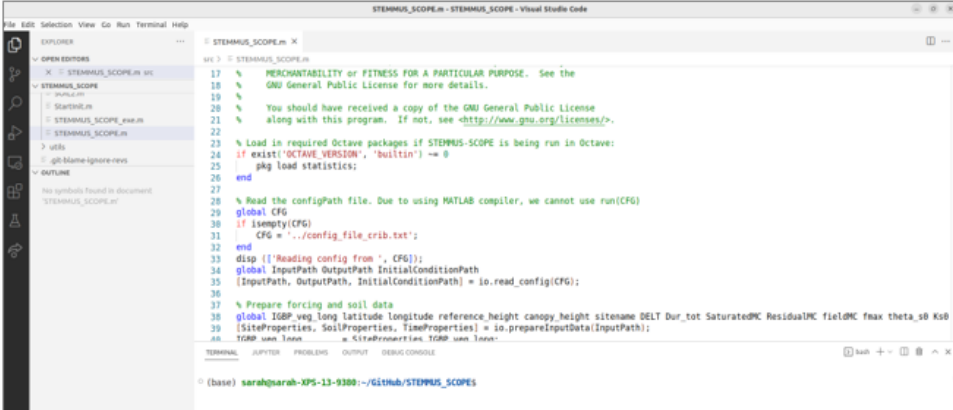
## Create a branch

- `git checkout main`
- `git pull`
- `git checkout -b <branch_name>`

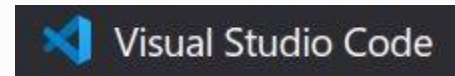


## Develop and test

- A code editor, a terminal, a file browser not a notebook
- Change and test
- Commit and push

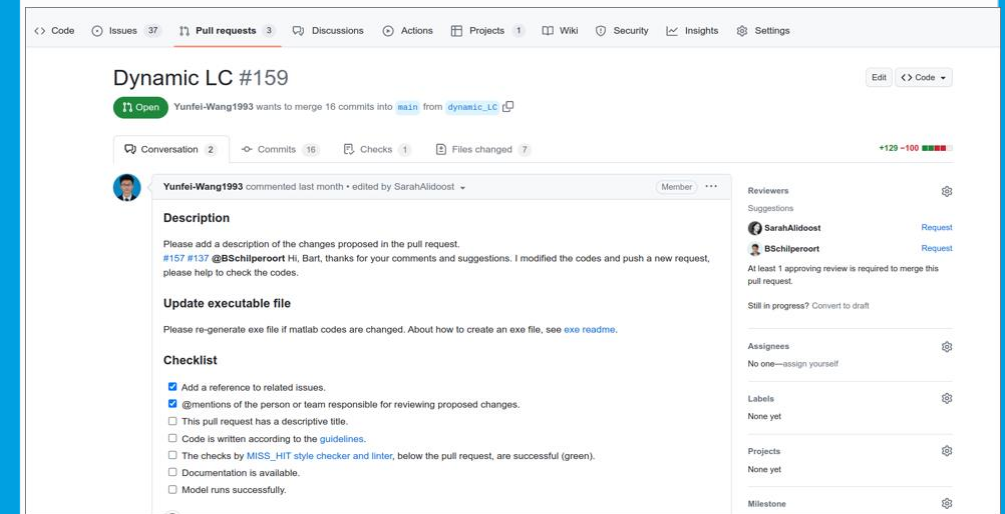


```
17 % MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the
18 % GNU General Public License for more details.
19 %
20 % You should have received a copy of the GNU General Public License
21 % along with this program. If not, see <http://www.gnu.org/licenses/>.
22 %
23 % Load in required Octave packages if STEPMUS-SCOPE is being run in Octave:
24 if exist('OCTAVE_VERSION', 'builtin') == 0
25     pkg load statistics;
26 end
27
28 % Read the configPath file. Due to using MATLAB compiler, we cannot use run(CFG)
29 global CFG
30 if isempty(CFG)
31     CFG = '../config_file_crib.txt';
32 end
33 disp(['Reading config from ', CFG]);
34 global InputPath OutputPath InitialConditionPath
35 [InputPath, OutputPath, InitialConditionPath] = io.read_config(CFG);
36
37 % Prepare forcing and soil data
38 global IGBP_veg_long latitude longitude reference_height canopy_height sitename DELT_Dur_tot SaturatedDRC ResidualDRC fieldDRC fmax theta_s0 Kso
39 [SiteProperties, SoilProperties, TimeProperties] = io.prepareInputData(InputPath);
40 IGBP_veg_long = IGBP_veg_long(:);
41 IGBP_veg_long = IGBP_veg_long(IGBP_veg_long > 0);
```



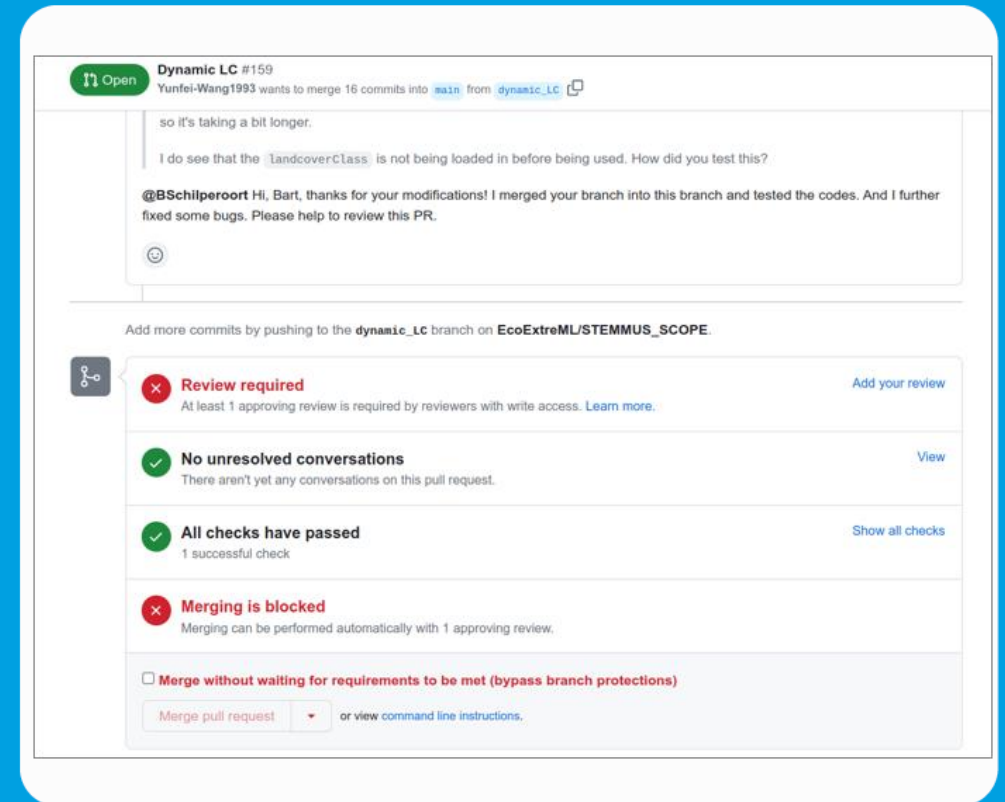
# Submit a pull request

- View changes
- Check list
- Ask for feedback



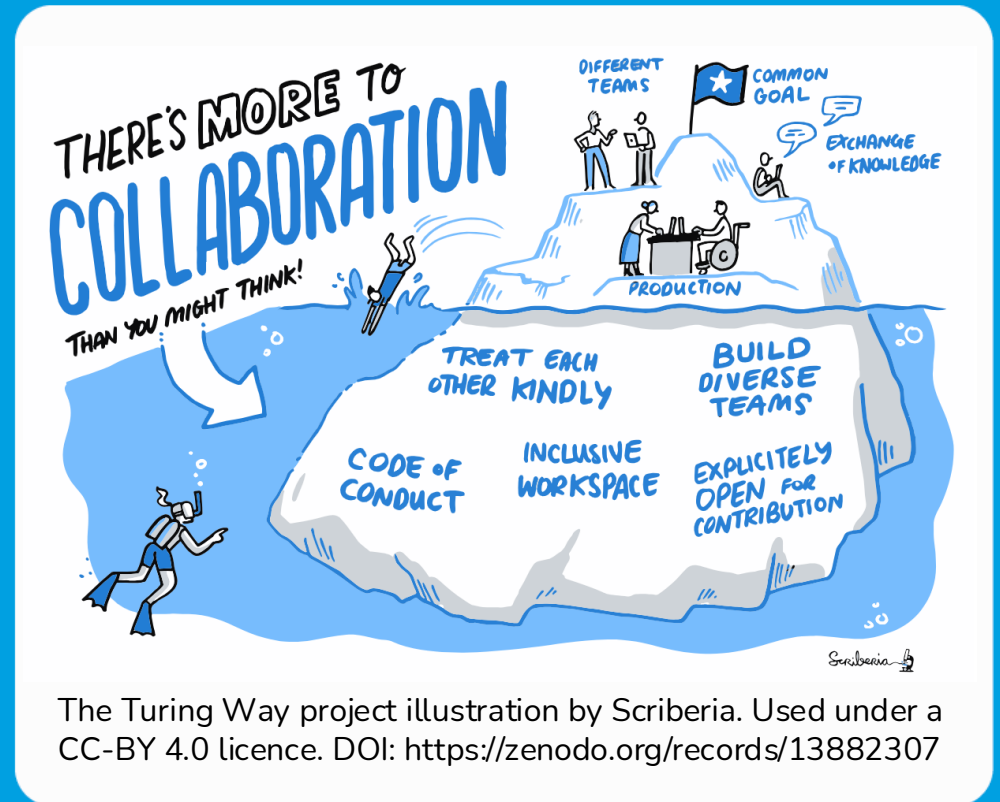
# Review and merge

- View changes
- Check list
- Give feedback



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# Remote code development

Setup update meetings:

daily stand-up, check-in/out moments, monthly meetings, ...

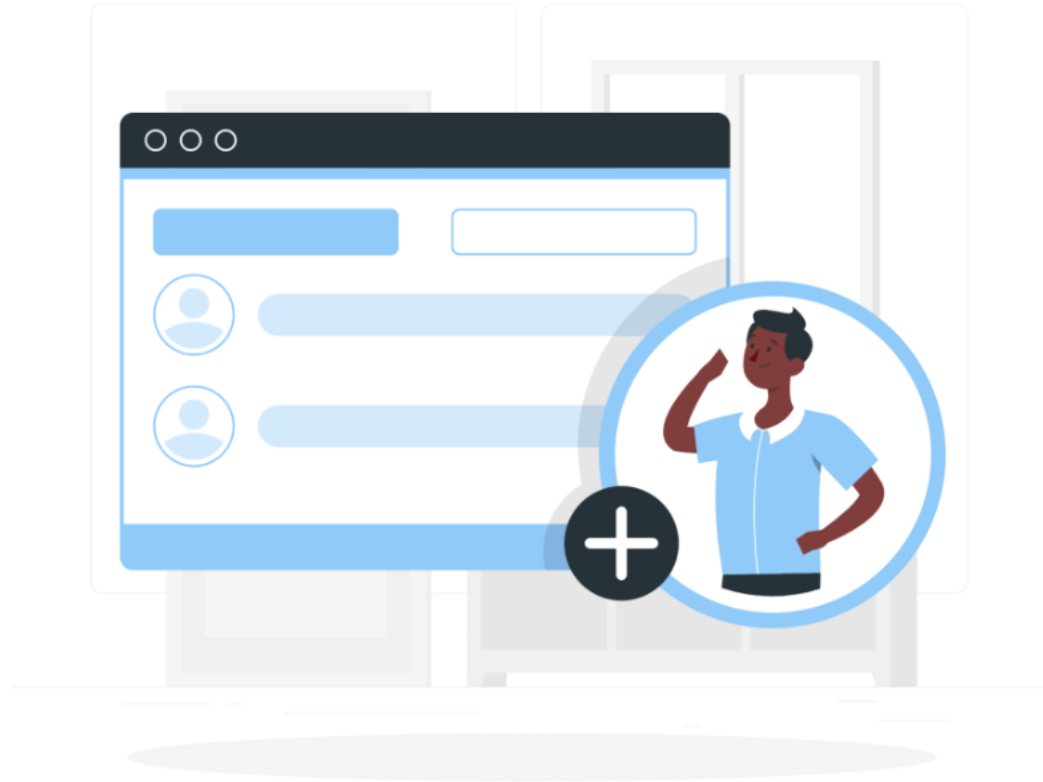
What I did,  
What I will do,



# Remote code development

Choose a communication channel:

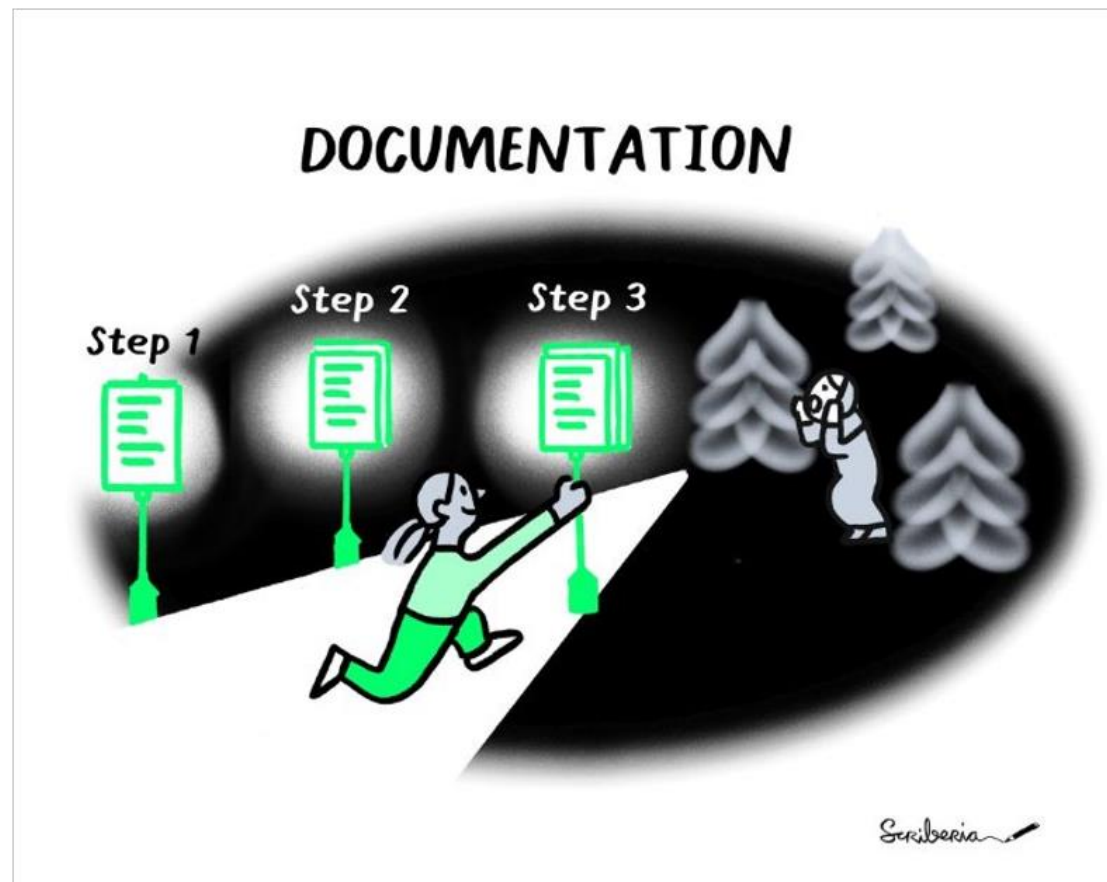
MS teams, slack, GitHub issue, GitHub discussion page, ...



# Remote code development

Add guides:

readme.md, contributing.md, pull request templates, issue templates, ...



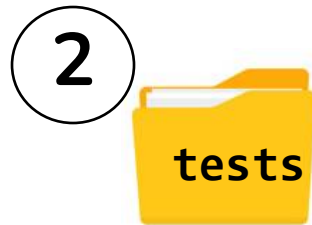
# Remote code development

Use automate testing (advanced):

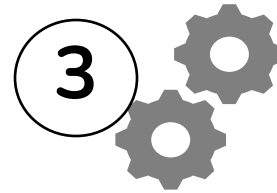
GitHub action workflow, unit tests



1  
Write tests in  
test\_\*.py files



2  
Store files in  
"tests" folder



3  
Install pytest and  
its dependencies  
from pyproject.toml  
file



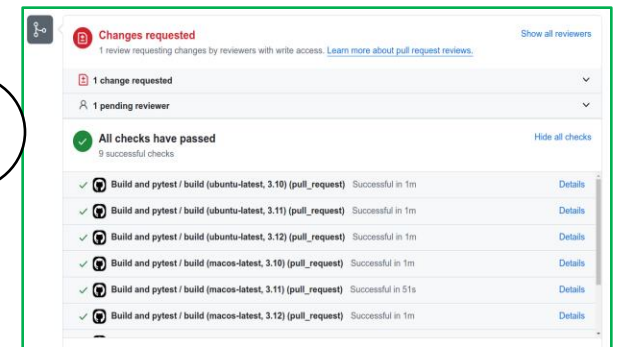
4  
Run tests locally



5  
Setup GitHub Actions  
workflow .yml file



6  
Start the workflow  
e.g. after a commit

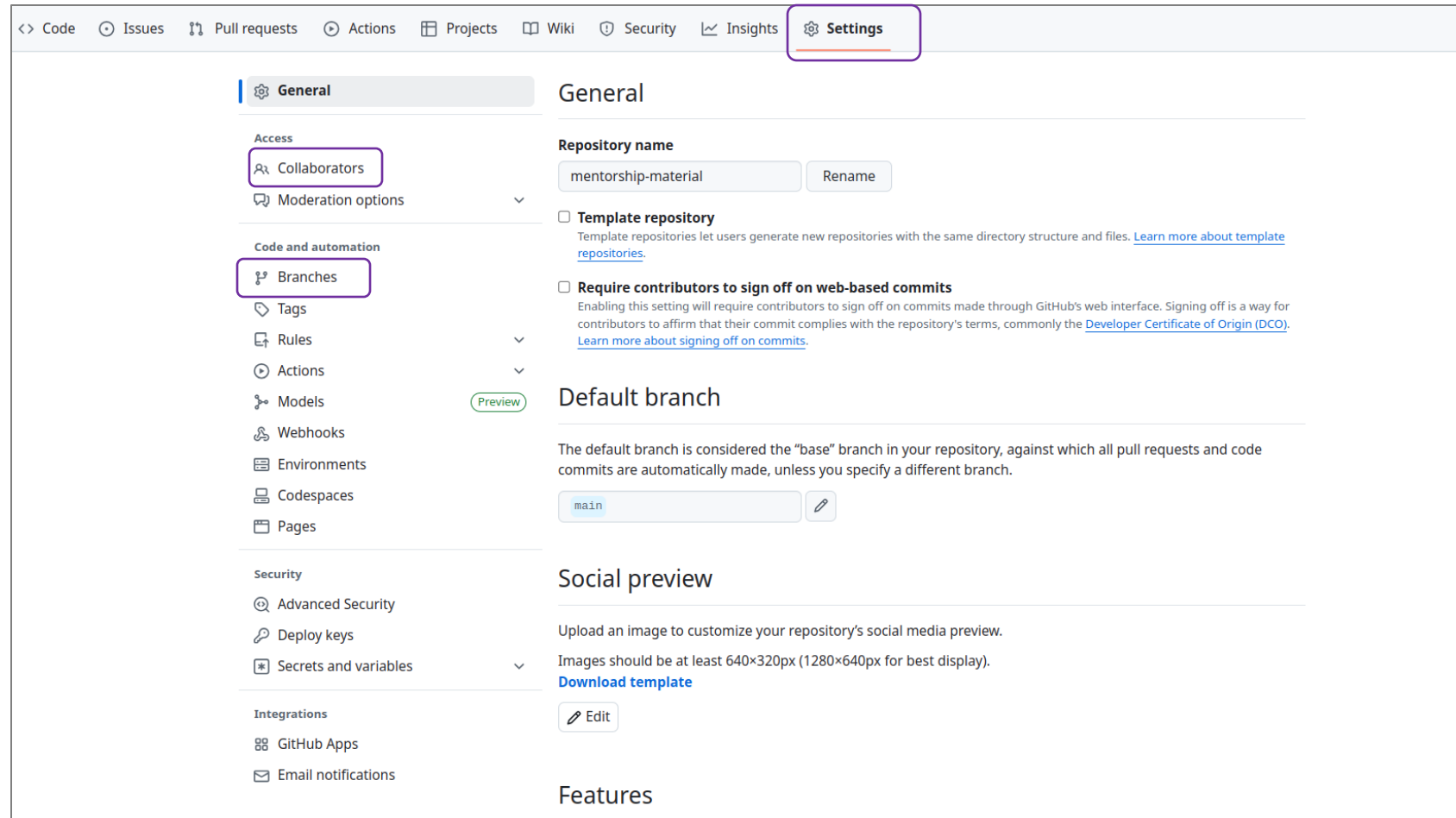


7  
Check the results of  
actions online

# Remote code development

Use GitHub facilities:

branch protection, merge permissions, team access



The screenshot shows the GitHub repository settings page for a repository named 'mentorship-material'. The 'Settings' tab is selected in the top navigation bar. The left sidebar contains a list of settings categories: General, Access, Code and automation, Security, and Integrations. Under 'Access', 'Collaborators' is highlighted. Under 'Code and automation', 'Branches' is highlighted. The main content area shows the 'General' settings. The 'Repository name' is 'mentorship-material'. There are checkboxes for 'Template repository' and 'Require contributors to sign off on web-based commits'. The 'Default branch' is set to 'main'. There is a 'Social preview' section with a description and a 'Download template' link. The 'Features' section is partially visible at the bottom.

<> Code Issues Pull requests Actions Projects Wiki Security Insights **Settings**

**General**

**Access**

Collaborators

Moderation options

**Code and automation**

Branches

Tags

Rules

Actions

Models

Webhooks

Environments

Codespaces

Pages

**Security**

Advanced Security

Deploy keys

Secrets and variables

**Integrations**

GitHub Apps

Email notifications

**General**

**Repository name**

mentorship-material

Rename

☐ **Template repository**

Template repositories let users generate new repositories with the same directory structure and files. [Learn more about template repositories.](#)

☐ **Require contributors to sign off on web-based commits**

Enabling this setting will require contributors to sign off on commits made through GitHub's web interface. Signing off is a way for contributors to affirm that their commit complies with the repository's terms, commonly the [Developer Certificate of Origin \(DCO\)](#). [Learn more about signing off on commits.](#)

**Default branch**

The default branch is considered the "base" branch in your repository, against which all pull requests and code commits are automatically made, unless you specify a different branch.

main

**Social preview**

Upload an image to customize your repository's social media preview.

Images should be at least 640×320px (1280×640px for best display). [Download template](#)

Edit

**Features**

Check out the references at :

<https://github.com/SarahAlidoost/mentorship-material/blob/main/Reference.md>