

Git and Github

USING GIT AND GITHUB IN RSTUDIO

19.03.2025

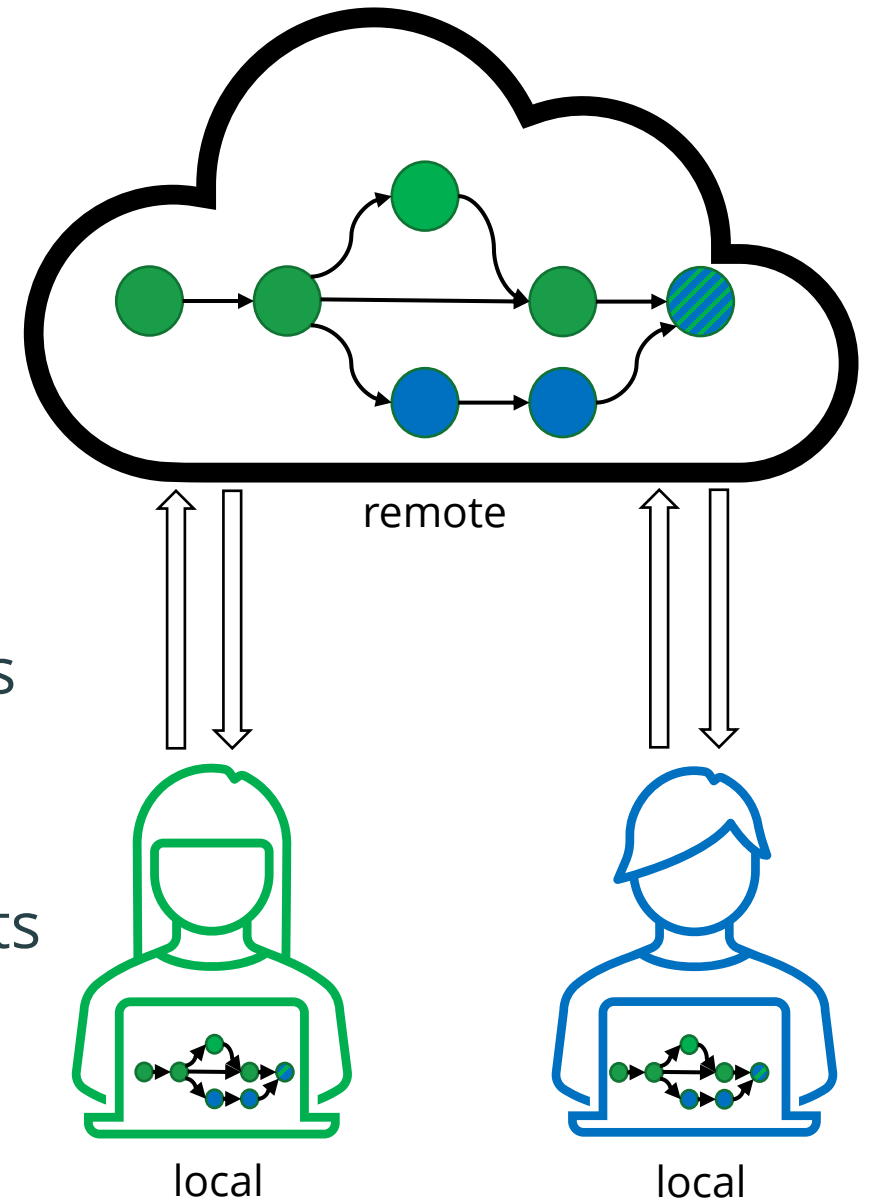
SUSIE JENTOFT (& DANIEL LUPP)



Statistisk sentralbyrå
Statistics Norway

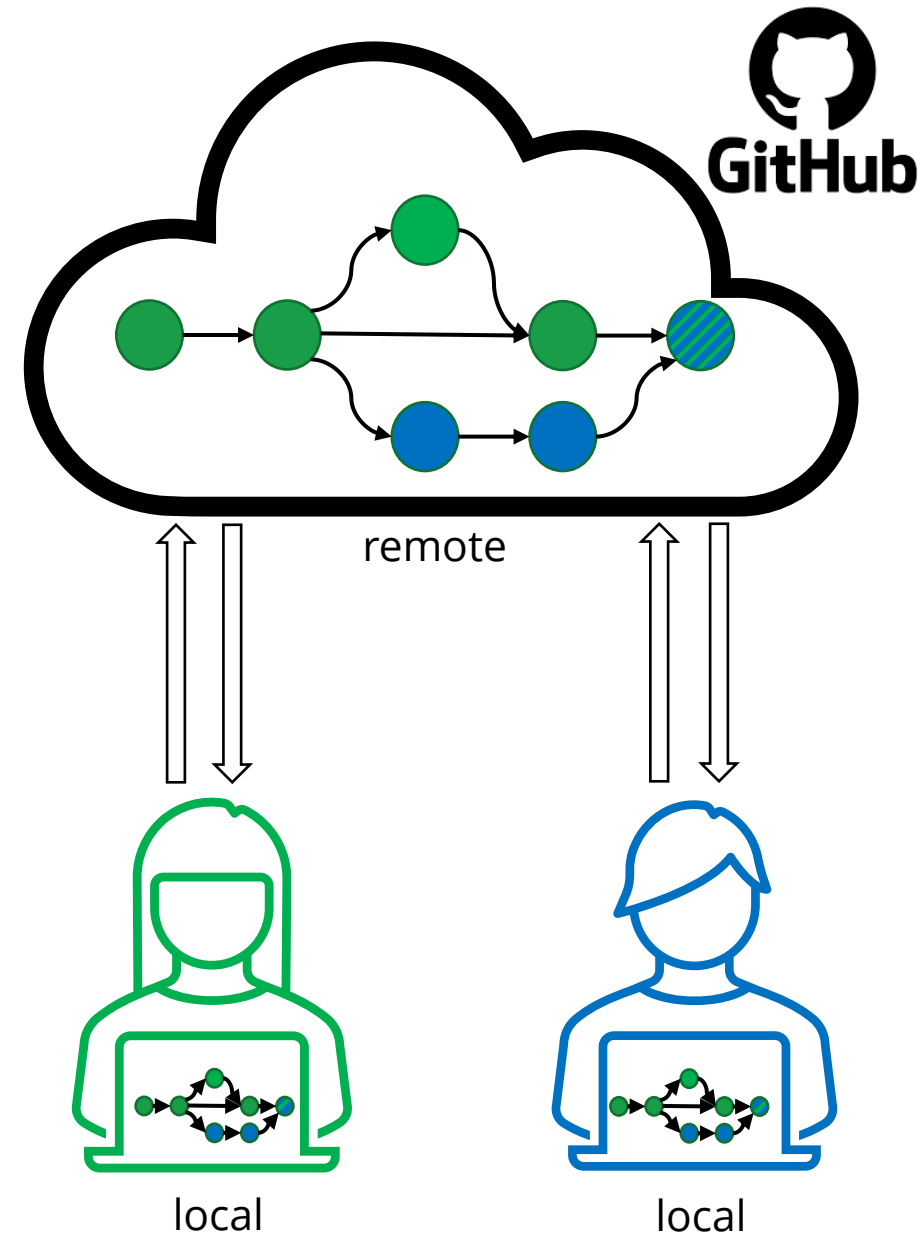
What is git?

- Version control system
- Tool for working together on code projects without simultaneously overwriting changes
- Allows tracking of changes, reverting to previous states, branch for new developments



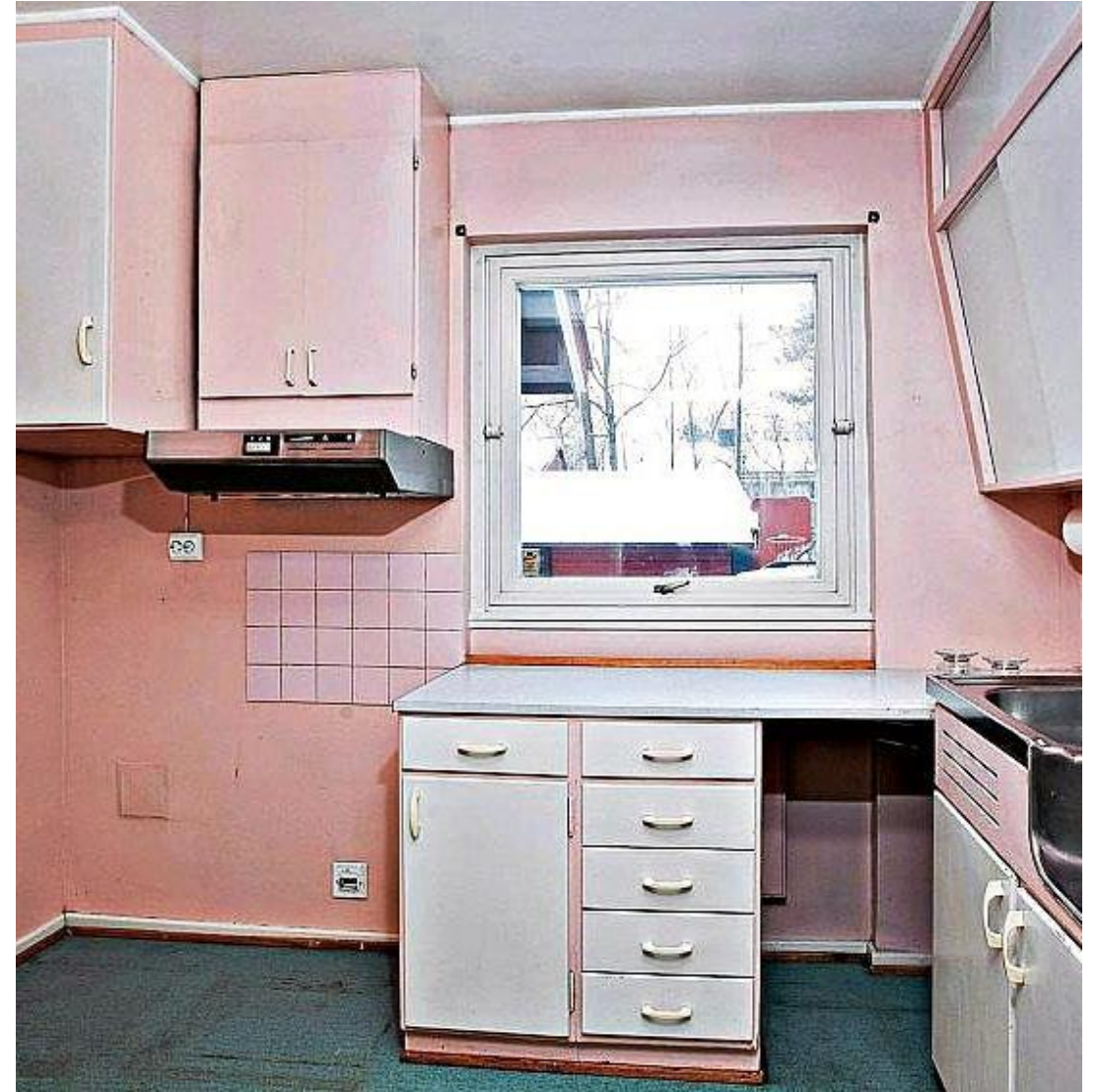
What is GitHub?

- GitHub is a web-based platform
- Uses Git for version control and provides a collaborative environment
- It offers tools for code review, project management, and continuous integration.
- Store and manage your code in repositories



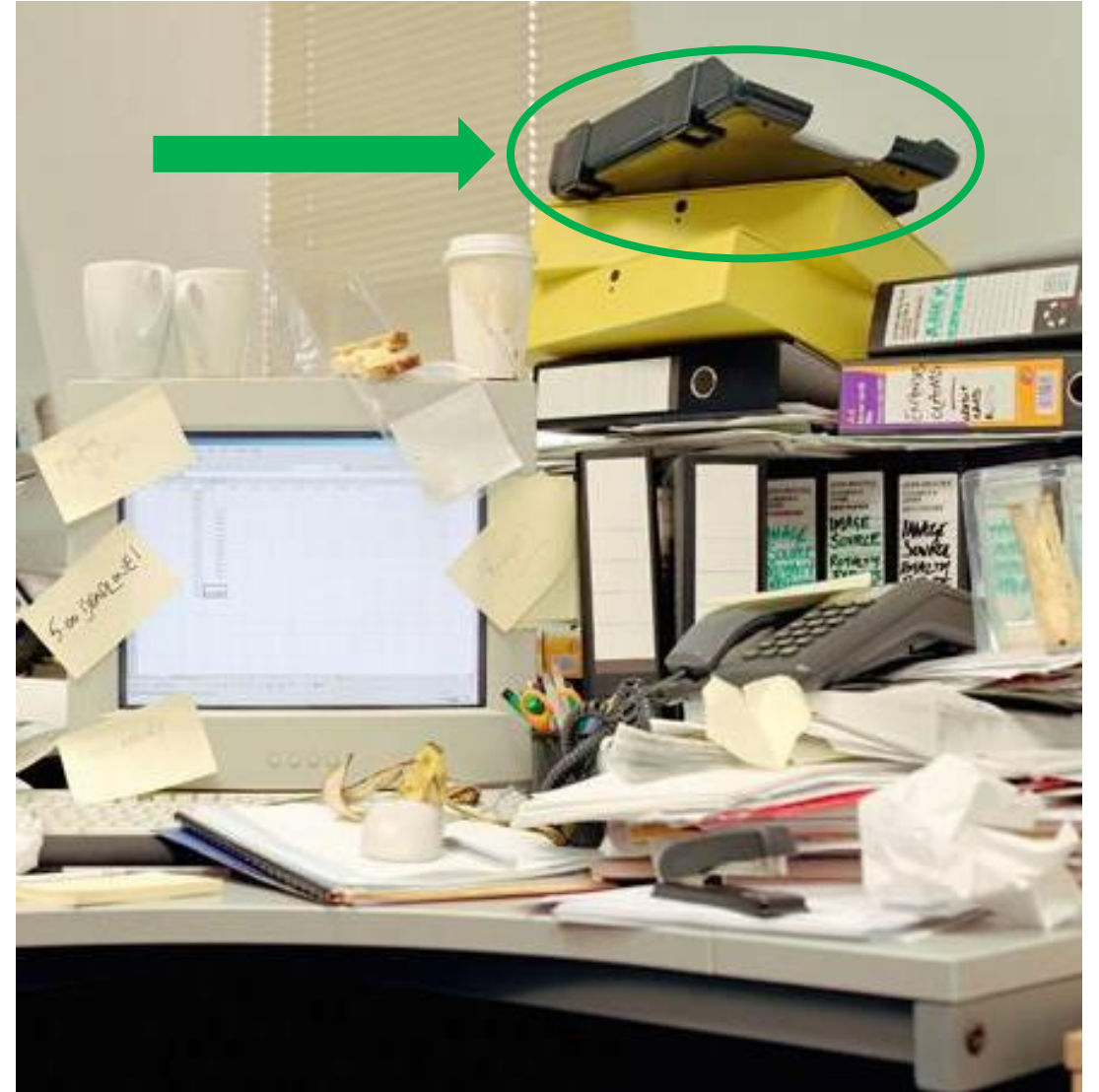
An introduction story

- A family has bought a old house that needs renovation.
- The kitchen is going to be fixed up, but they have many ideas.
- They make a copy of the kitchen layout and each person draws their idea.



An introduction story

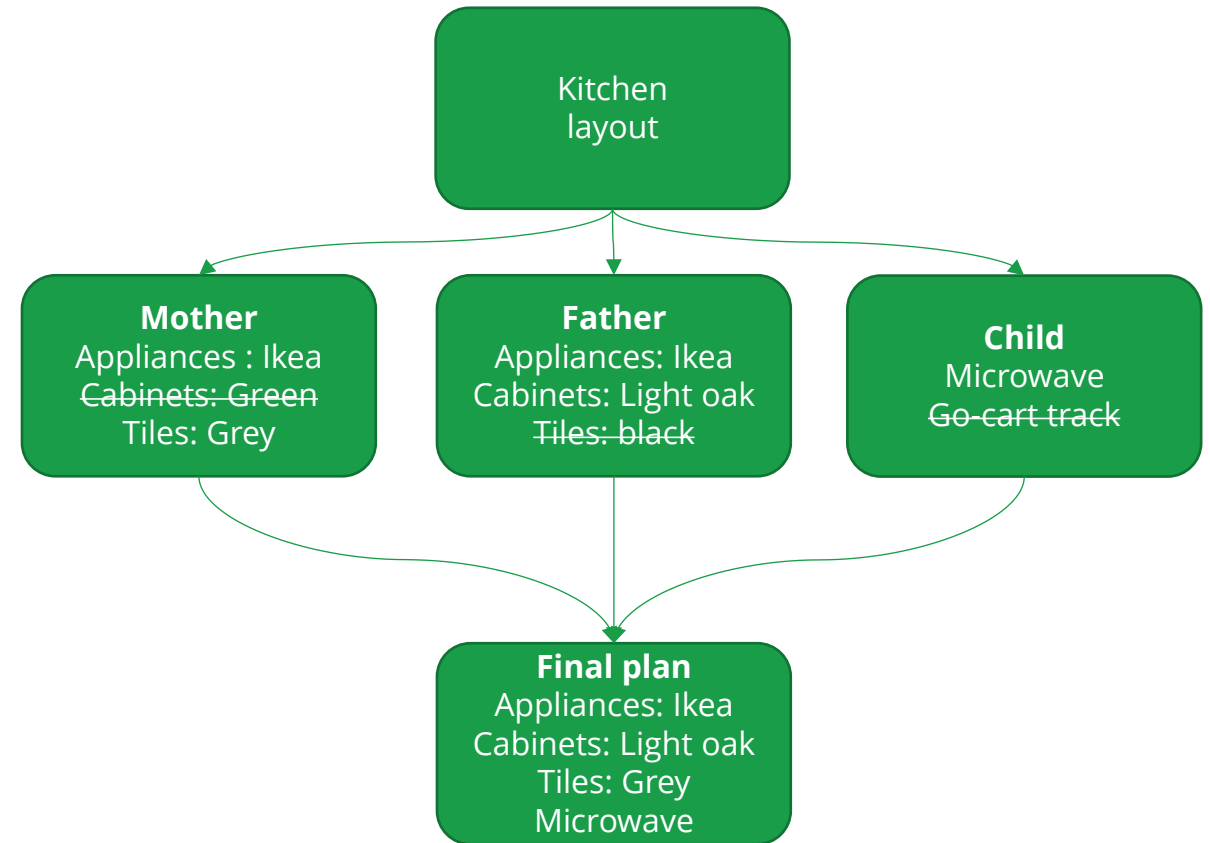
- The father goes to his office
- It is very messy with many different notes.
- Her writes his ideas in a plan to show the rest of the family.



An introduction story

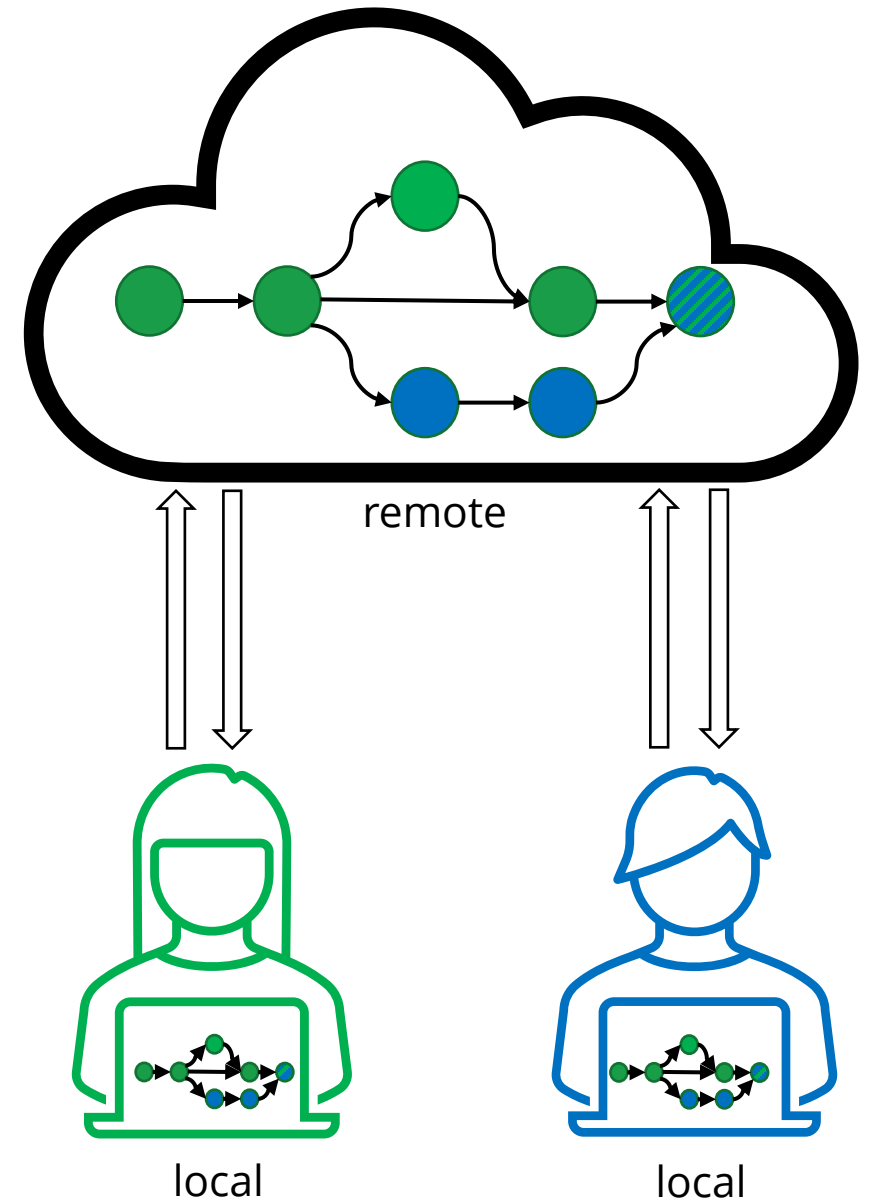
- The family gathers the ideas
- The look where they agree and where there are conflicts
- They agree on a common solution

...this is git!

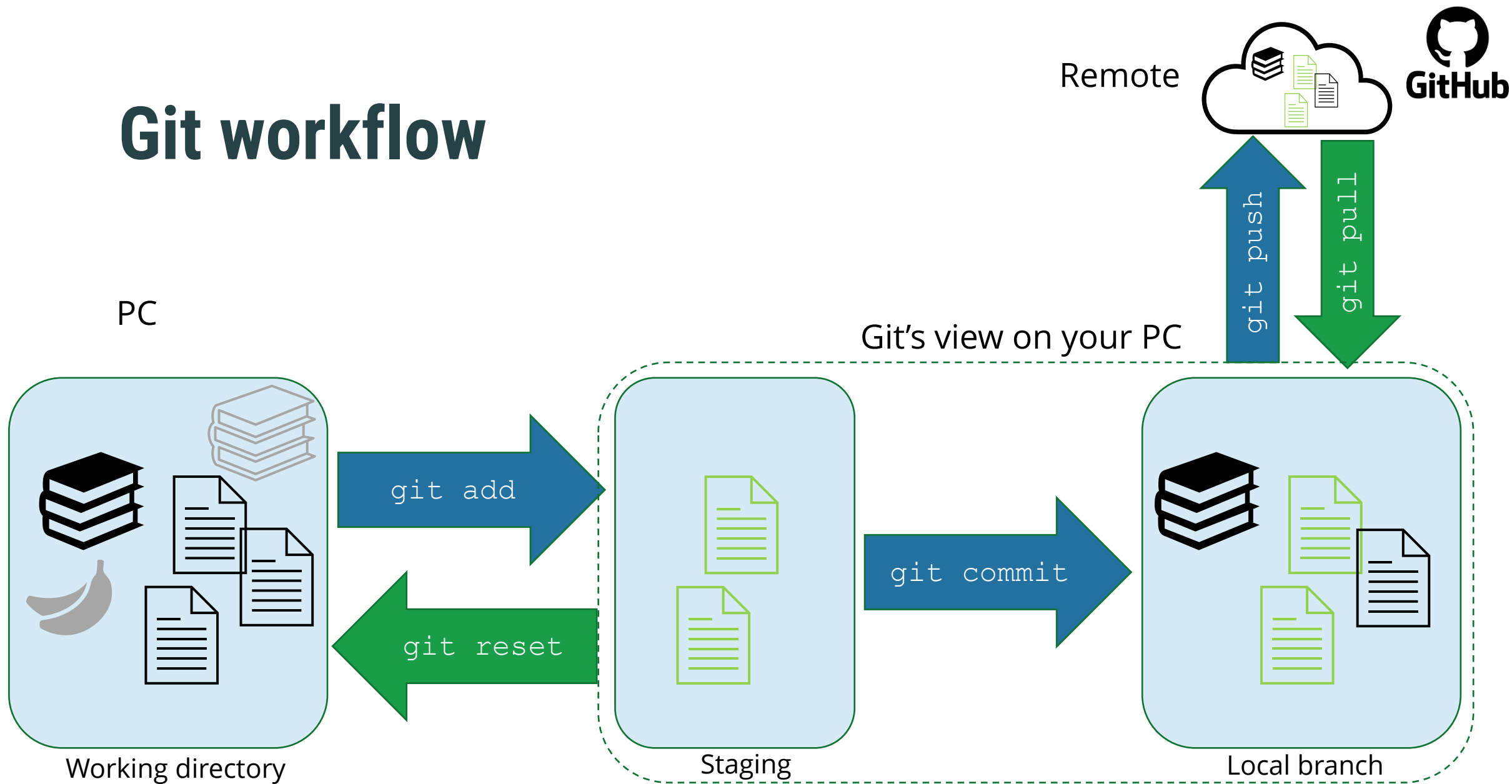


What are branches?

- A branches is a seperate version of the project.
- Allows separate lines of development.
- Git keeps track of (1) changes to files, (2) who has done changes, (3) a short message and (4) time on a branch.
- Branches can grow together again/merge.
- In story: Mother, father, had their own branch.



Git workflow



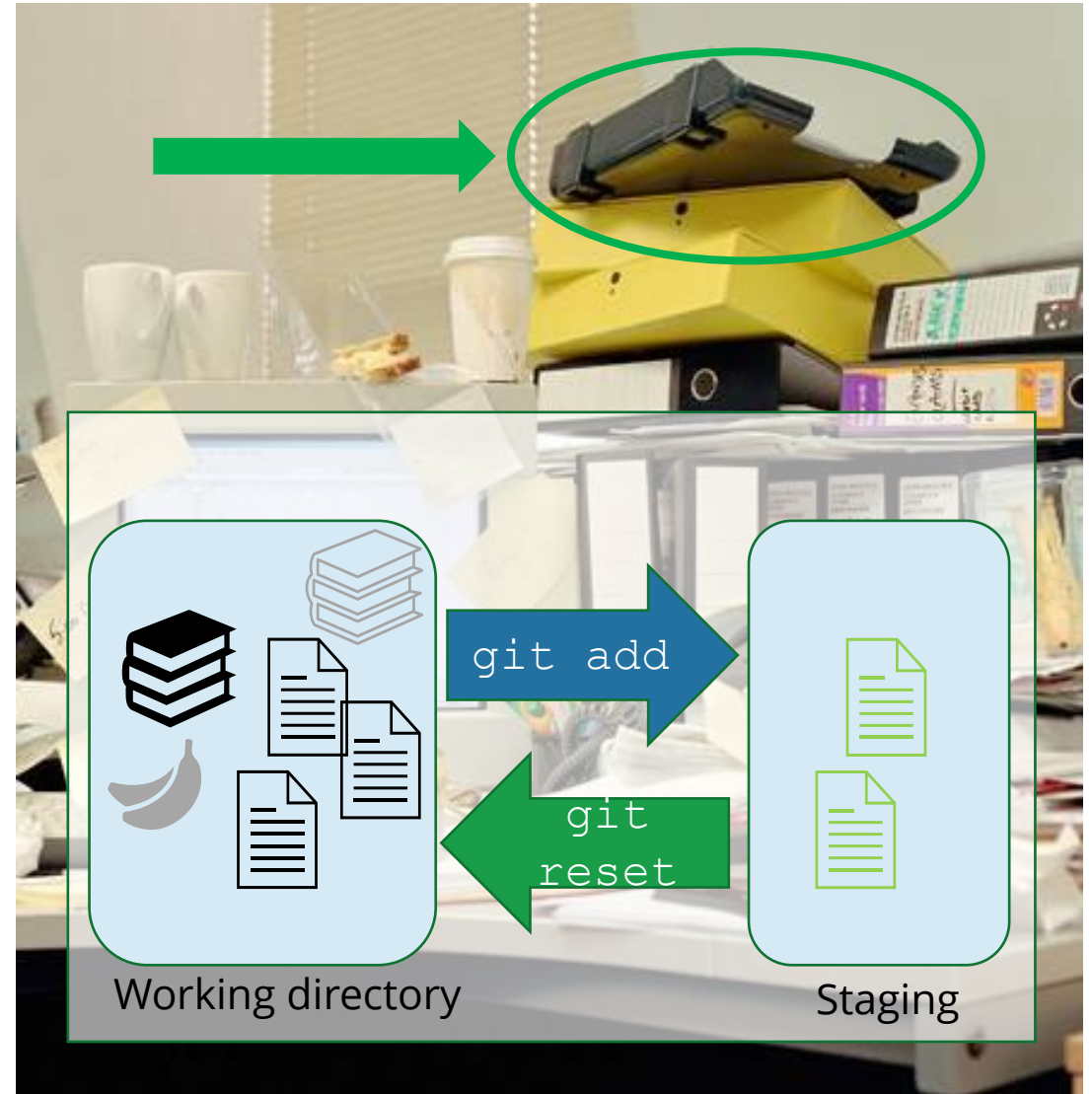
Working directory

- Local folder on your computer
- Can contain files and folders not on the repository



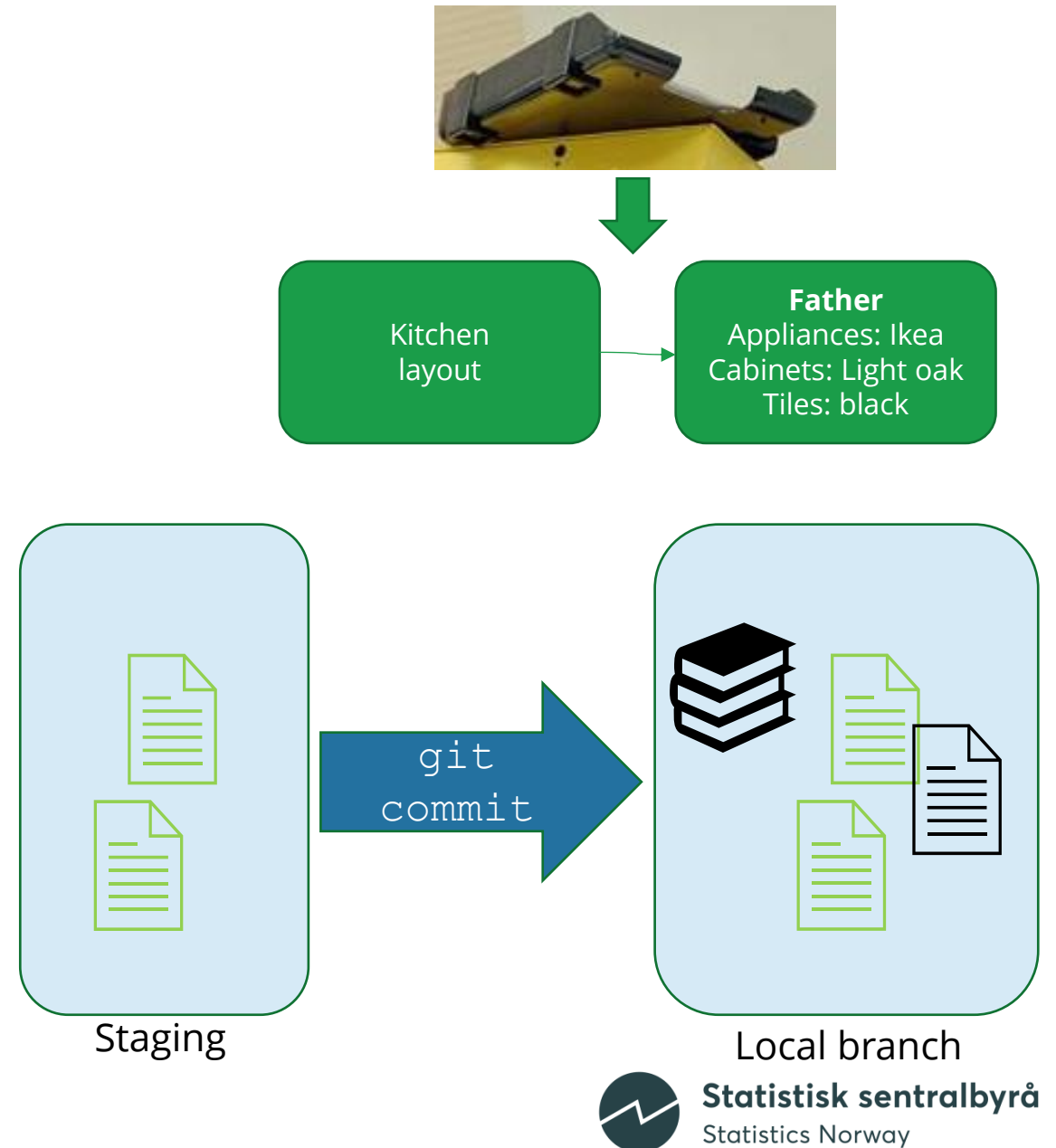
Staging

- Get git to follow changes
- Staging area is a place where you can group changes together before creating a commit



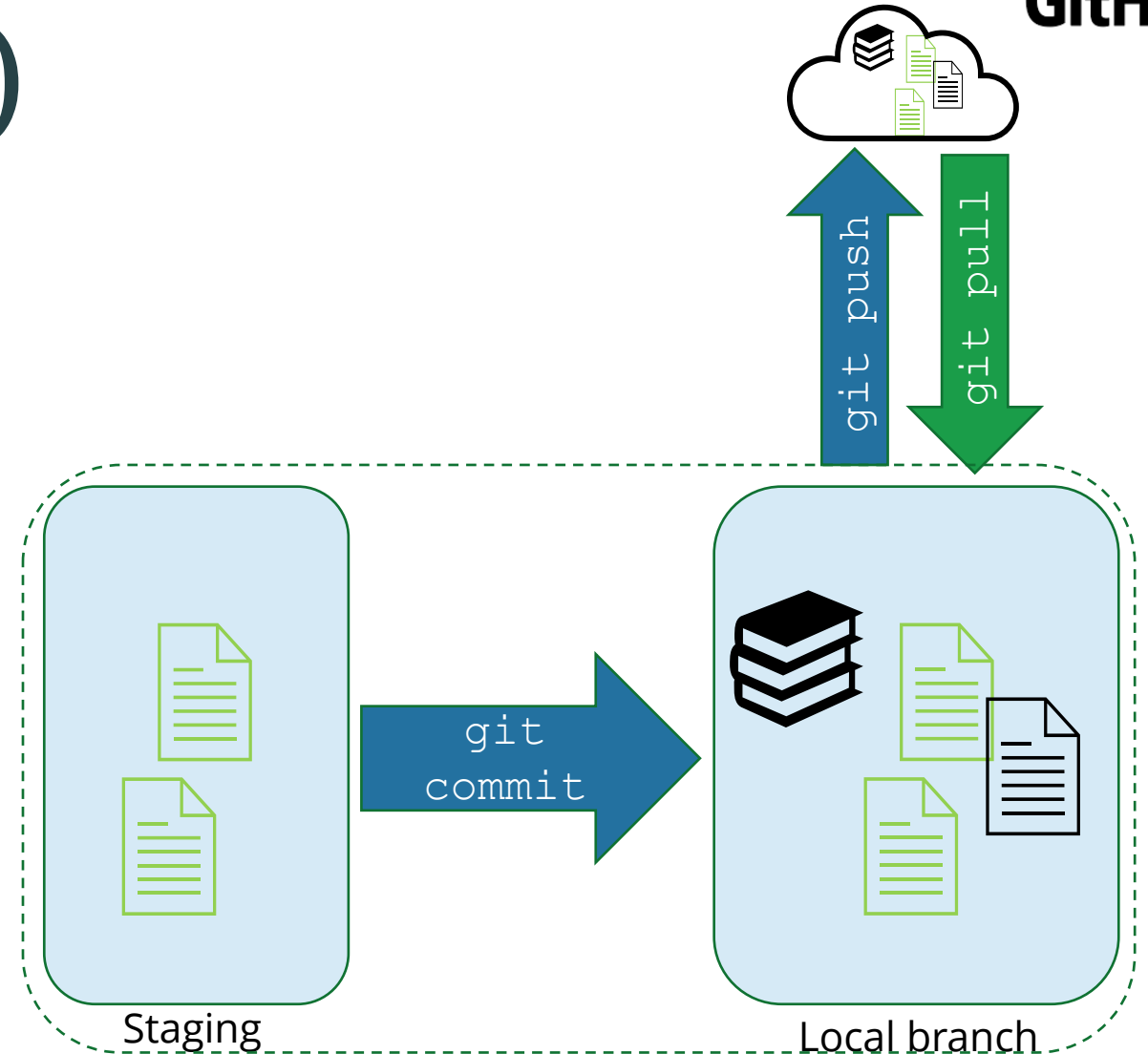
Local branch

- At some point you need to commit changes to your local branch.
- A message is required to describe changes.
- All changes and version control so far are only on your PC



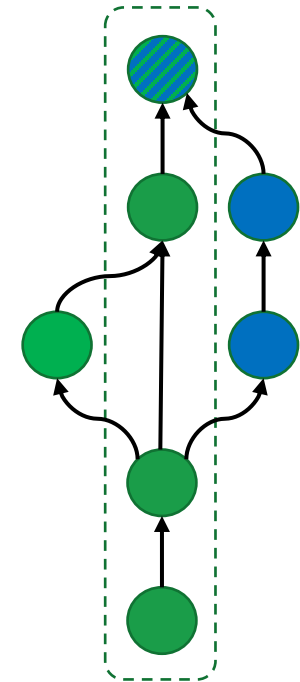
Push to remote (GitHub)

- Push your local branch to the remote
- In the story: share your kitchen ideas with the rest of the family.



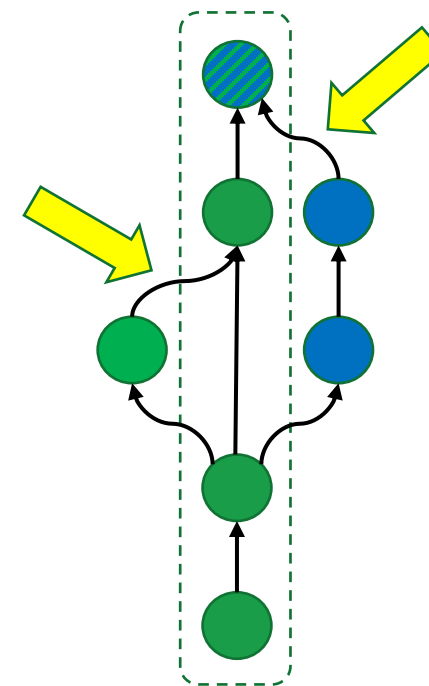
Main branch

- Git repositories begin with one branch (usually called «main»)
- General rule: The main branch should always be able to run and be stable.
- General rule: Don't work directly on the main branch.
Ingen utvikling på hovedbranch

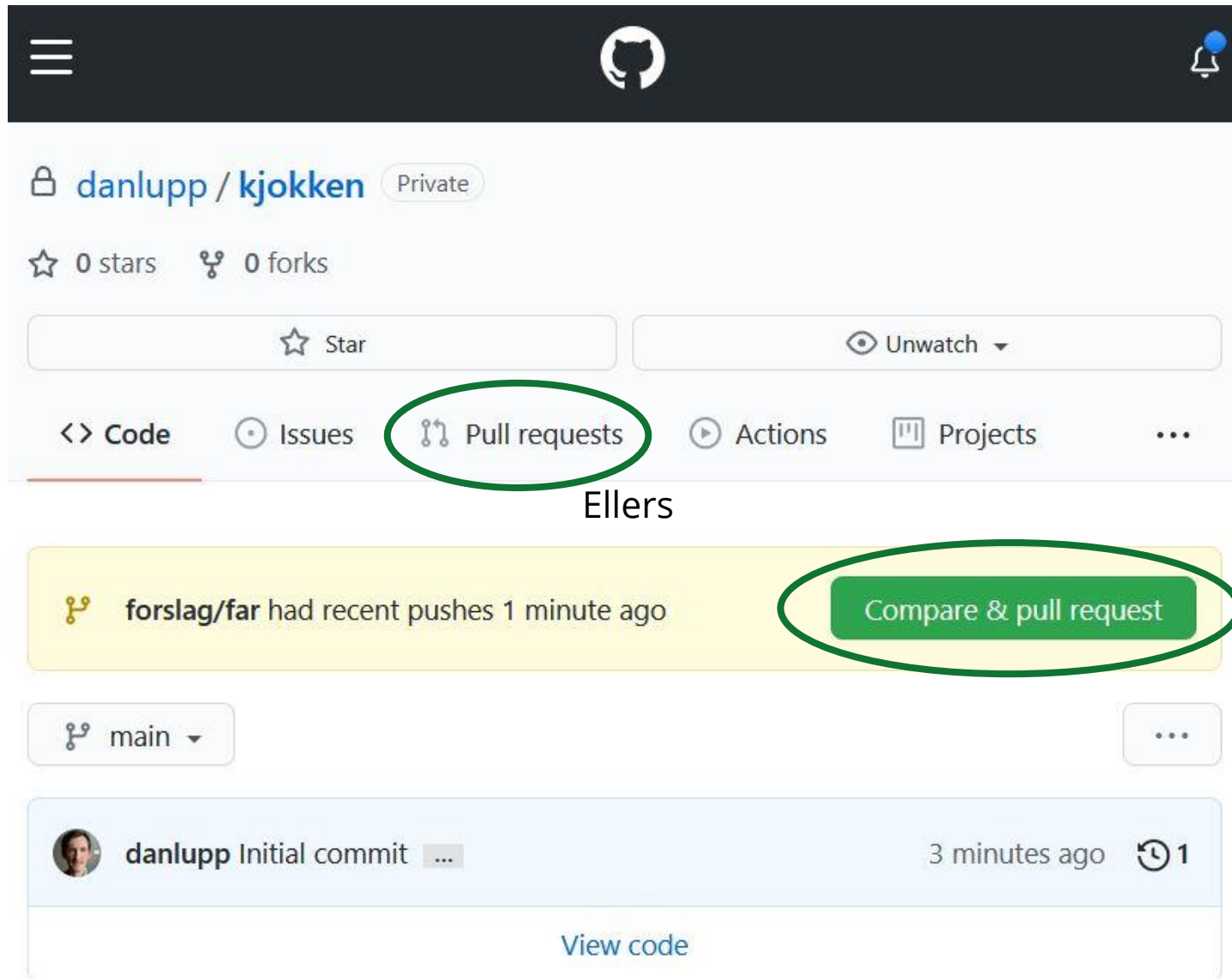


Pull request

- Use a Pull request to ask for a review of new code on one branch before merging into another branch (main).
- The idea is that a separate person checks and approves the changes so that they become «official».
- In the story: Father has collected up all the ideas, the mother approves the changes so they can be sent to the builder.



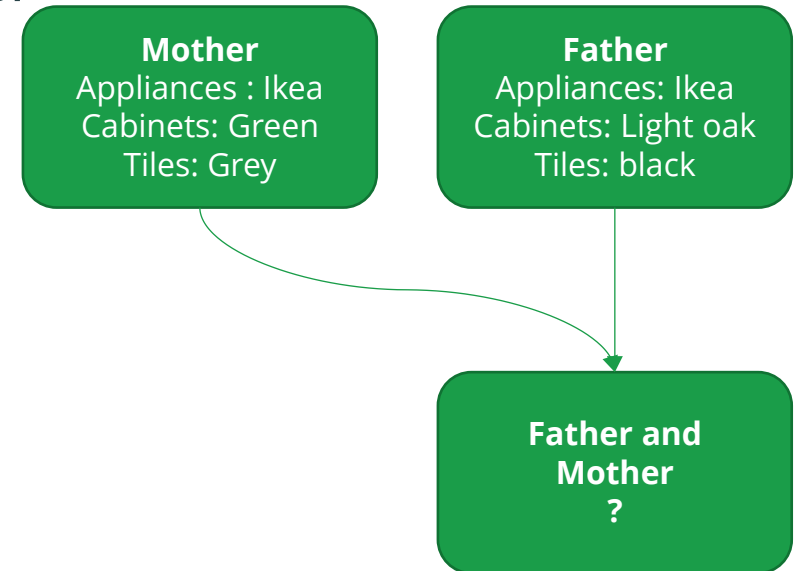
Pull request Github



Ellers

Merge

- Transfer changes from one branch to another using merge.
- Git will try to merge changes automatically.
- If there are conflicts, these will be marked in the file and need to be resolved.

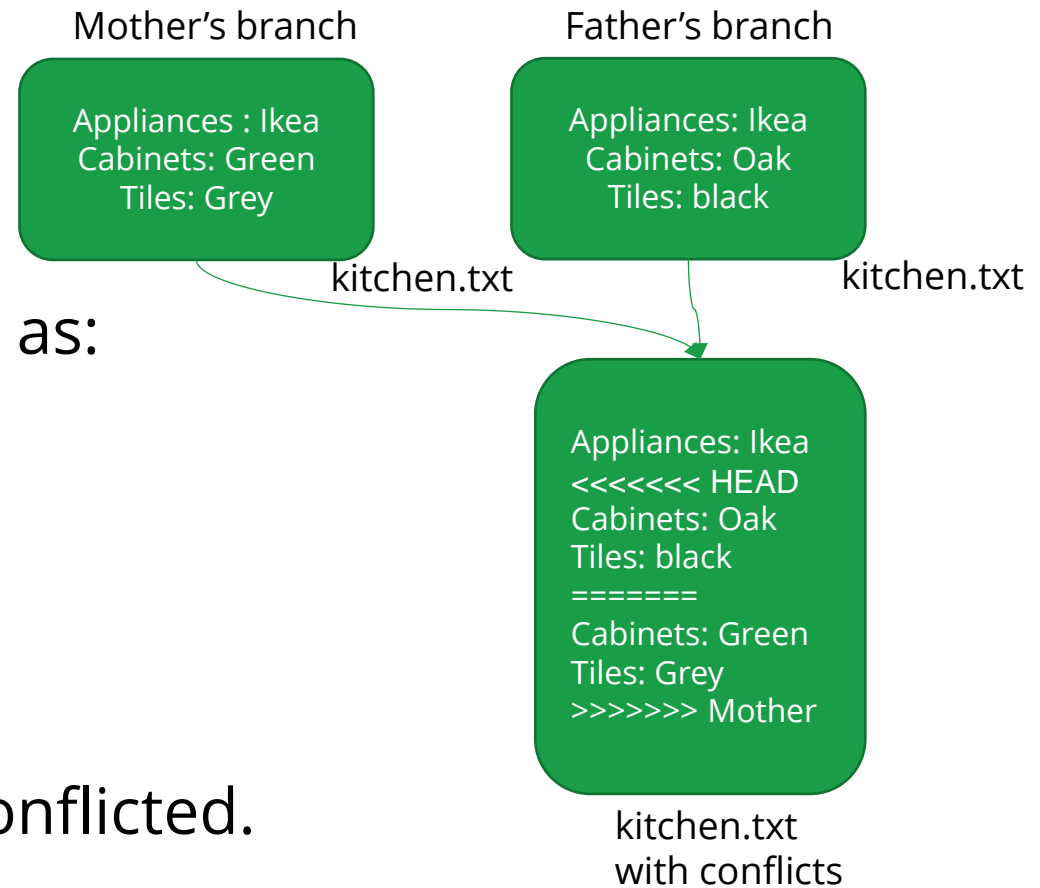


Merge conflicts

- Conflicts are marked in the file as:

```
<<<<<<< HEAD
text in your branch
=====
text in the other branch
>>>>>>> name of other branch
```

- Everything outside this isn't conflicted.
- Conflicts need to be solved before branched can be merged.

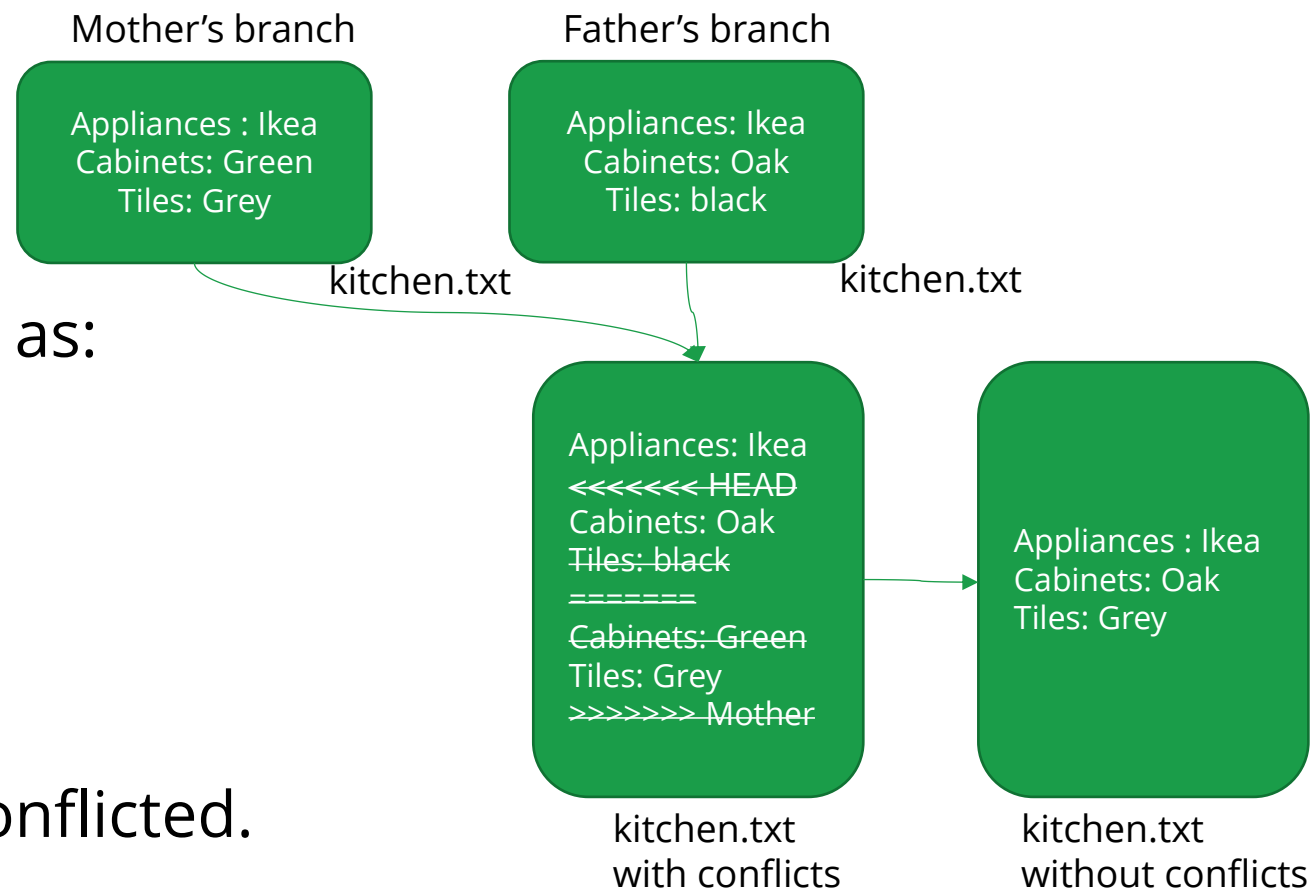


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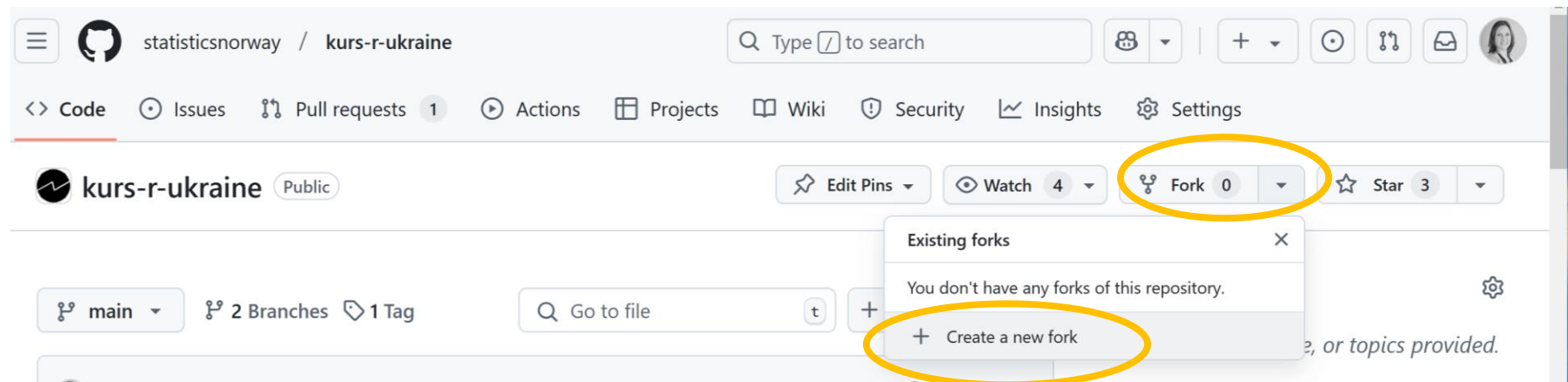
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Fork

- Create a personal copy of someone else's repository.
- Allows changes without affecting the original project.
- You can later propose your changes to be merged back into the original repository via a pull request.



Key terms

Term	Action command
Repository	Where you store and manage your code (project folder)
Clone	Make a copy of a repository on your PC
Remote	Version of your repository that is hosted on a Github server
Pull	Fetch and integrate changes from a remote repository into your local repository
Add	Add files from your working directory to staging, preparing them to be included in the next commit
Commit	Record of changes made to the repository with a message, capturing a specific point in time.
Push	Uploads your local commits to a remote repository.
Pull request	A proposal asking for changes to branch in a repository to be reviewed, before merging them.
Merge	Integrates changes from one branch to another.

kurs-r-ukraine - dev-git - RStudio

File Edit Code View Plots Session Build Debug Profile Tools Help

Go to file/function Addins

Rcode_day1.R

```
1 # Example code for R Introduction course - DAY 1
2
3 ##### Basic calculations #####
4 2 + 2
5 5 - 2
6 25 * 4
7 5 ^ 2
8
9 # A small number
10 5E-2
11
12 # A large number
13 3E7
14
```

Source on Save Run Source

Environment History Connections **Git** Tutorial

Diff Commit Pull dev-git

Your branch is ahead of 'origin/dev-git' by 1 commit.

Staged	Status	Path
<input type="checkbox"/>	M	Rcode_day1.R

Files Plots Packages Help Viewer Presentation

Folder File Delete Rename

C: > Users > coo > repos > kurs-r-ukraine

	Name	Size	Modified
<input type="checkbox"/>	.git		
<input type="checkbox"/>	.gitignore	44 B	Feb 24, 2025, 12:33 PM
<input type="checkbox"/>	.Rhistory	12.1 KB	Feb 20, 2025, 11:00 AM
<input type="checkbox"/>	.Rproj.user		
<input type="checkbox"/>	Analysis_Ukraine.Rmd	2 KB	Feb 12, 2025, 9:36 AM
<input type="checkbox"/>	Dashboard_KOSTRA.Rmd	5 KB	Feb 12, 2025, 9:36 AM
<input type="checkbox"/>	data		
<input type="checkbox"/>	exercises		
<input type="checkbox"/>	kurs-r-ukraine.Rproj	252 B	Feb 24, 2025, 12:35 PM

Console Terminal Background Jobs

R 4.4.2 · C:/Users/coo/repos/kurs-r-ukraine/

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'help.start()' for an HTML browser interface to help.
Type 'q()' to quit R.

> |

Commit and write a message

Pull in changes

Create new branch

Add to staging

Push changes to GitHub

kurs-r-ukraine - dev-git - RStudio

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Advantages of using Git

- **Collaboration:** work together and review code.
- **Version Control:** track changes, revert to previous versions, and manage different branches of your project.
- **Integration:** integrates with various CI/CD tools, making it easier to automate testing and deployment.

