Git, GitHub, and Jupyter

Lecture Notes

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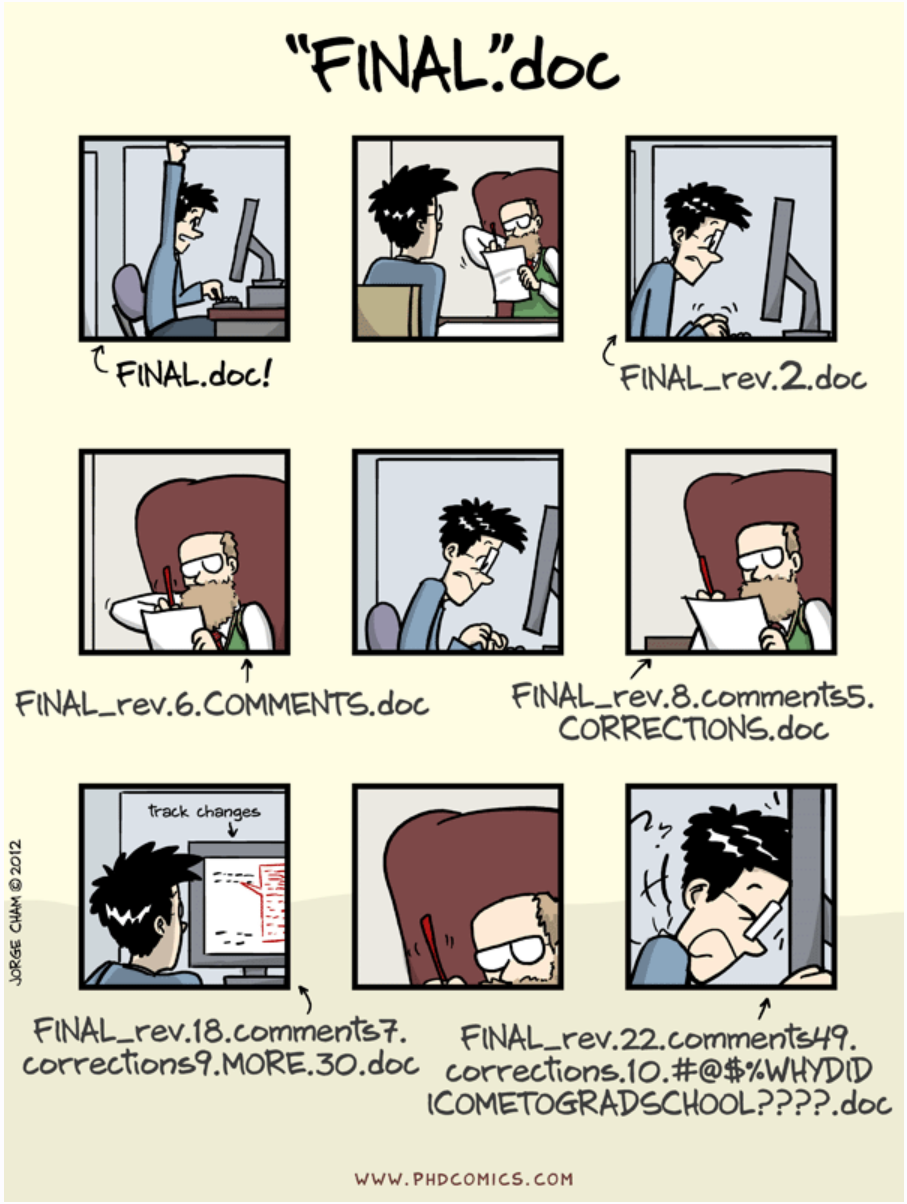
Learning objectives:

- Understand **version control** and its role in collaborative software development.
- Learn to effectively use **Jupyter notebooks** for data analysis and collaborative documentation.
- Develop skills to set up and manage **collaborative workflows** with Git/GitHub and Jupyter for group projects.

An introduction to version control


"FINAL".doc
FINAL.doc!
FINAL_rev.2.doc
FINAL_rev.6.COMMENTS.doc
FINAL_rev.8.comments5.
CORRECTIONS.doc
track changes
FINAL_rev.18.comments7.
corrections9.MORE.30.doc
FINAL_rev.22.comments49.
corrections.10.#@$%WHYDID
ICOMETOGRADSCHOOL????.doc
JORGE CHAM © 2012
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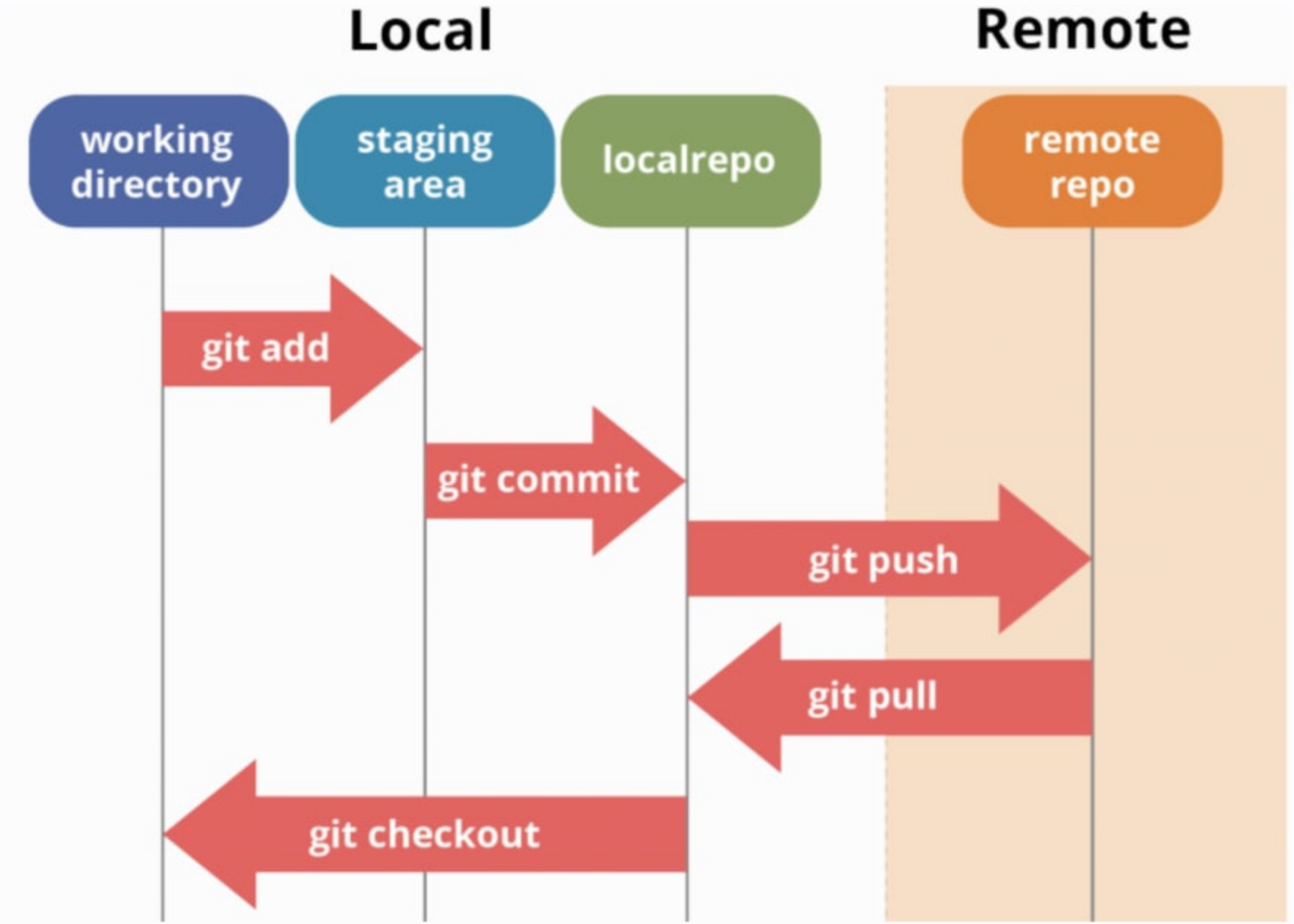
Basics of version control

1. Add file(s) to a staging area.
   ```
   git add myfile.py
   ```
2. Write changes to a local repository.
   ```
   git commit -m "made some changes"
   ```
3. (Opt.) Push changes to *remote* repository.
   ```
   git push -u origin main
   ```

Note: while it's good to know these commands, we will use a GUI to make it easier.


Local
Remote
working directory
staging area
localrepo
remote repo
git add
git commit
git push
git pull
git checkout

Git is helpful on its own:

- It lets you easily track changes to your code
- If something goes wrong, you can rollback to an earlier, working version
- You can organize your tasks and workflow ("branching")

But it really shines when used with GitHub!

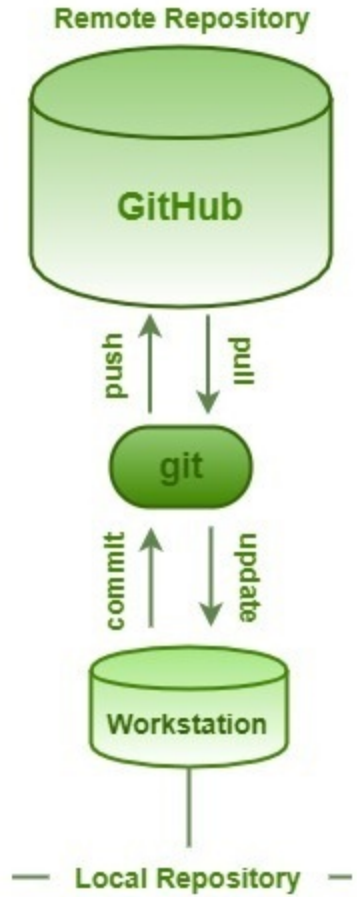
GitHub

GitHub

GitHub is a website where you can host your code & files in databases called "repositories."

I don't fully understand how GitHub gets money but they offer tons of services for free. No need to question it!

Distributed Version Control System

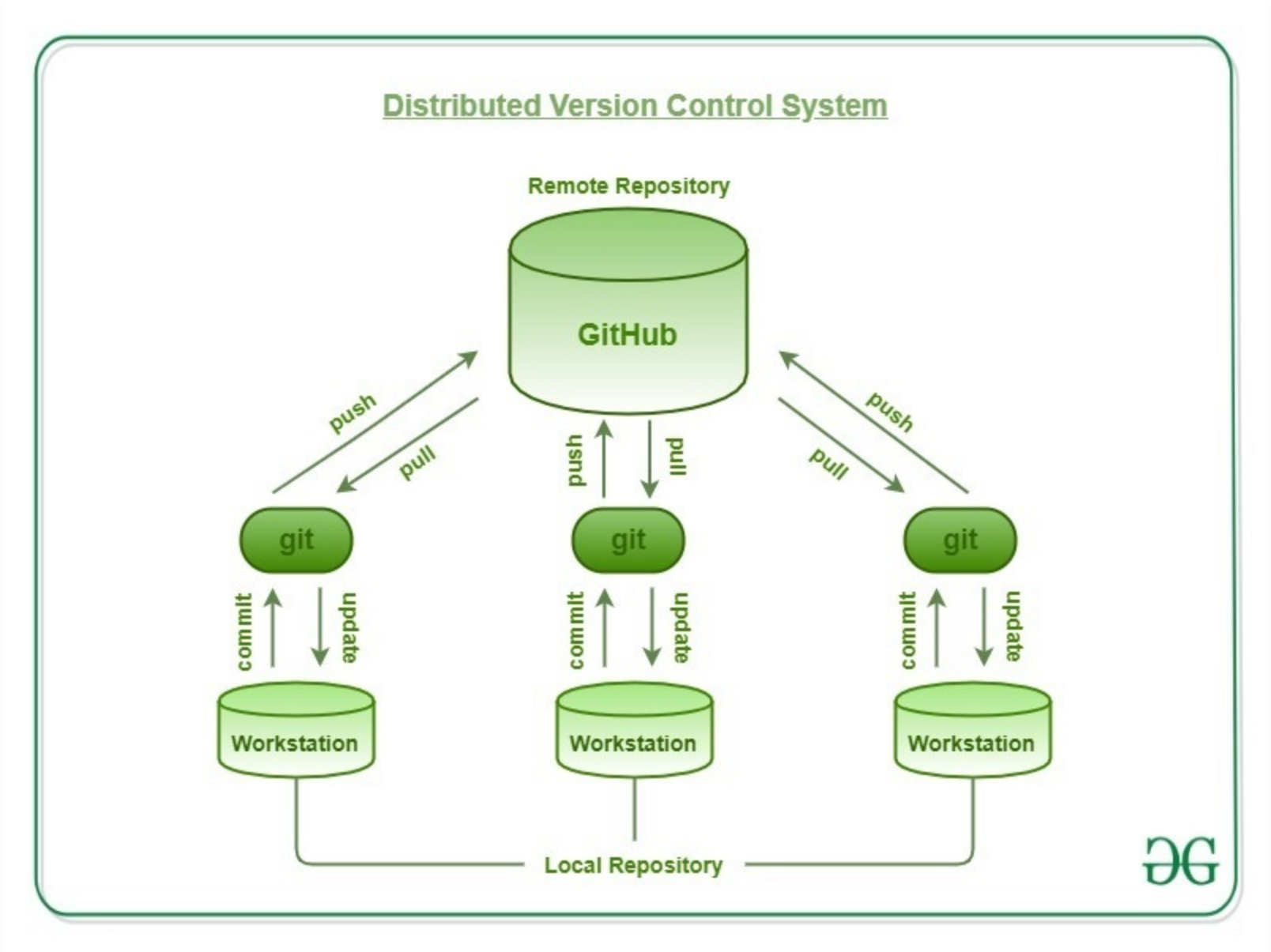


Here's a typical workflow.

1. `git add your-files-here.txt` to add your files and edits to the staging area
2. `git commit -m "your message here"` to put these updated files to your *local* repository
3. `git push` your changes to GitHub repository

Note: Before pushing the first time, we will have to connect our Git and GitHub repositories.

Branching


Distributed Version Control System
Remote Repository
GitHub
push
pull
push
pull
push
pull
git
git
git
commit
update
commit
update
commit
update
Workstation
Workstation
Workstation
Local Repository

Branching

In Git/GitHub, branching creates **a parallel version of the code** to work on new features or fixes *without affecting the main codebase*. It allows developers to isolate their work, make changes, and then merge those changes back into the main code when they are ready.

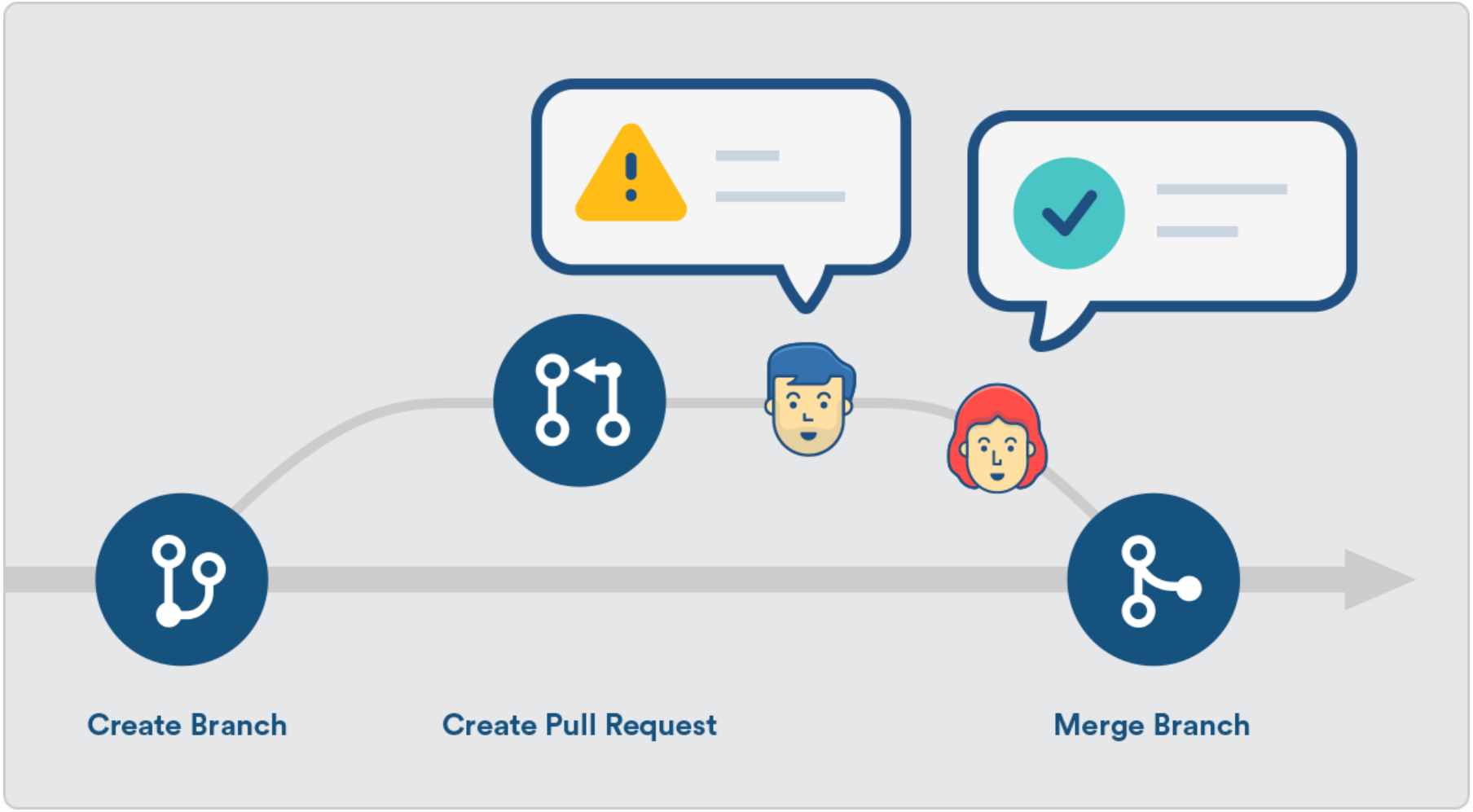
Branching workflow

- Create and switch to branch
- Add commits
- Push branch to GitHub
- Start a **pull request**
- Review & merge

Pull requests

A pull request is a way to propose changes from a branch in a repository to the main code. It allows developers to notify others about the changes they've made, discuss modifications, and eventually merge the changes into the main code.

Pull requests



Version control with Git and GitHub can be confusing. You don't need to understand everything right now to develop a collaborative workflow for this class 😄.

Resources/References

- Learn git branching
- Git/GitHub Lecture by Madicken Munk
- GitHub Docs
- The Git book