Introduction to GitHub

Bioinformatics Data Science in Context

June 3, 2025

Learning Goals

By the end of this workshop, you will be able to:

- Create and use a GitHub repository
- Make changes to a file and commit the changes
- Create and merge a pull request
- Upload project files to a repository

Agenda

- Introduction to Git & GitHub
- Activities:
  - Creating a Repository
  - Committing Changes
  - Pull Requests
  - Uploading Files

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- **Introduction to Git & GitHub**
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What are Git and GitHub?

Three Volunteers:

Share one thing you know or one question you have about Git and/or GitHub.

What is Git?

removes need to store multiple files to track versions

- Open-source **version control** software

- Tracks changes in files
  - Individuals create **branches** off the main file to make independent edits
  - Git merges changes from multiple users into the main file

What is GitHub?

- Cloud-based platform for sharing code
  - Has a web interface
- GitHub allows you to:
  - Share your work
  - Track changes to your code
  - Get feedback from others
  - Work collaboratively on a project simultaneously
- Utilizes Git for version control of collaborative work

GitHub Profiles and Organizations

Profiles:

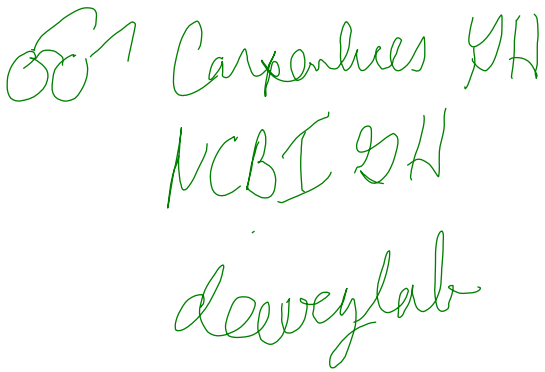
- Main page for an individual account
- You can personalize your profile with a picture, bio, etc.

Organizations:

- Shared accounts for businesses, open-source projects, etc.
- Individuals are invited to join, but still work through their own account
- Can assign roles & access levels to different individuals within the org

Create your own GitHub!

https://github.com/signup



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- **Activities:**
  - **Creating a Repository**
  - Committing Changes
  - Pull Requests
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Git Repository (Repo)

- Centralized storage for a project
  - Store code, files, and revision history
  - Analogy: Directory or folder
- Public or private
- Owned by individual or org
- Can have multiple collaborators

README

Best practice is to include a README file for your repository.

Tells others purpose and/or goals of the project, and how they can use it.

Demo

In Your Project Groups:

1. One member of your group creates your group repository

2. Add your group members as collaborators on the repository

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  - **Committing Changes**
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Commits

- Saved changes to a file
- Includes an associated commit message
  - Helps other users what change you made and why

Branches

- Copies of a repository
- Allow multiple people to work on the project at once without interfering with each others' work
- Default branch: **main**

Forks

Similar to branches, but creates a whole new copy of the repository under your profile.

Enables you to propose changes to repositories that you don’t have edit access to, or to use someone else’s project as a starting point for your own.

Demo

In Small Groups:

1. Each create a new branch for your repository.

2. Commit a change to your README file within your new branch.

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Pull Requests

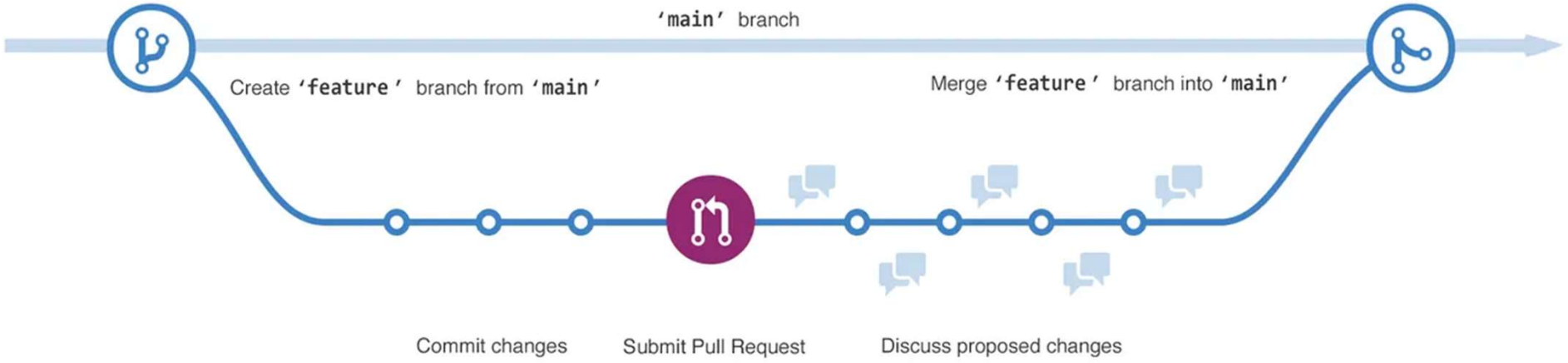

Image from GitHub Docs

Demo

In Small Groups:

1. Open a pull request from your commits.

2. Review your partner's pull request and merge the changes back to your **main** branch.

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  - **Uploading Files**

Ways to Upload Files

- From command line
  - (we won't cover this)
- On GitHub
- Directly from Colab!

Demo!

In Small Groups:

Upload a current copy of your project notebook to GitHub.

Issues

- Discussions associated with specific repos
  - Often about an issue or a bug
- Can be used by anyone, regardless of whether they are a collaborator
  - (assuming the repo is public)

Demo

Practice!

- Create an issue on the workshop-test repo

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Conclusion: Why use GitHub?

- Collaboration
- Version Control
- Share your code
  - Including on your resume!

Bonus: A Note on GitHub Pages

GitHub can be used to create websites

- Portfolio for your work
- Manual for code

Examples: Carpentries websites, RSEM manual

Questions?