

BIOS-584 Python Programming (Non-Bios Student)

Week 01 – Understand Git and GitHub

Instructor: Tianwen Ma, Ph.D.

Department of Biostatistics and Bioinformatics,
Rollins School of Public Health,
Emory University

Git

- Open source and free source control management (SCM)
- Allow tracking changes in your codebase, collaborate with others, and manage your projects
- Standard for version control
- A powerful tool but a bit challenging to use for beginners
- GitHub kicks in to help.

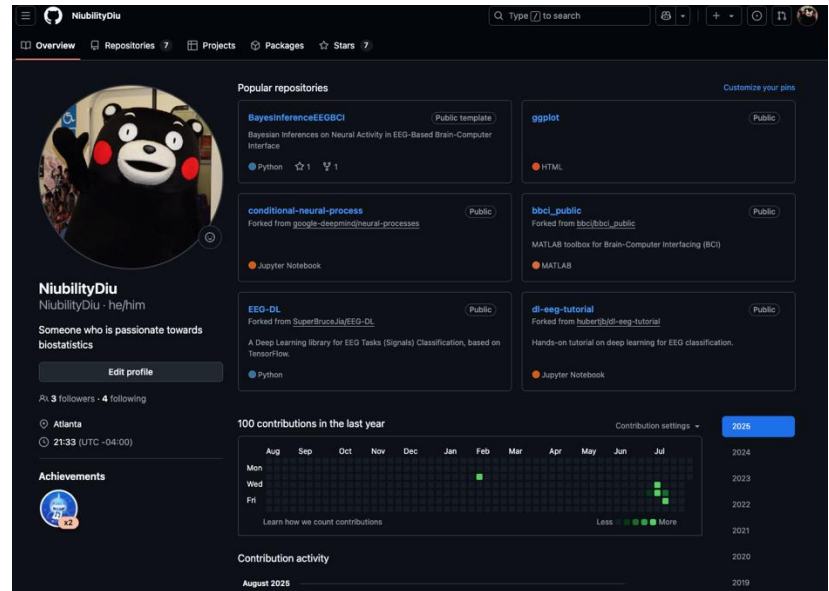
GitHub

- A web-based platform to provide hosting for Git repositories, allowing you to store different versions of your code in the cloud and collaborate with others.
- Other features including issue tracking, project management, and continuous integration.
- It can even host your website for free.
- Social network for developers, where you can follow other developers, star their projects, and contribute to open-source projects.

Get Started with GitHub

Create a GitHub Account

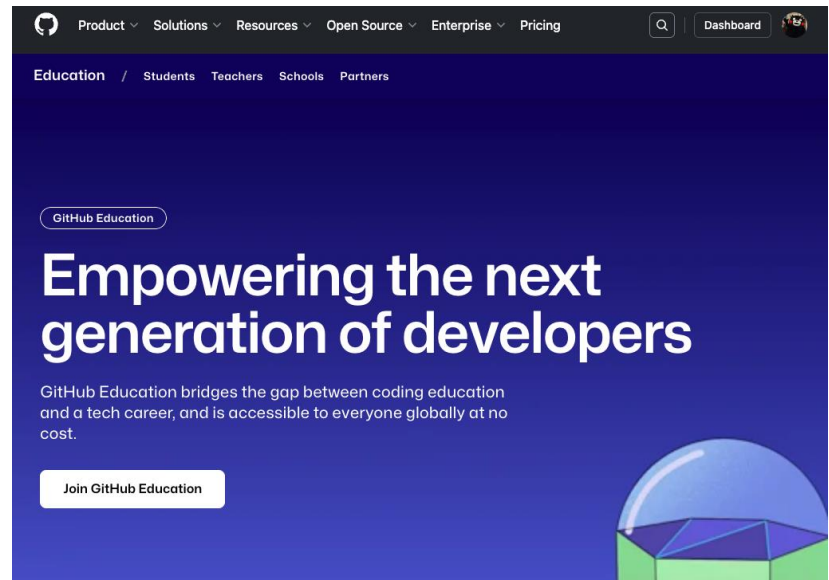
- <https://github.com/>
- Free educational account with Emory email address
- Be careful with your username as it is visible to the public



This is my profile page.

Apply to GitHub Education

- <https://github.com/education> for GitHub Student Developer Pack.
- Free domain name, cloud hosting, etc.
- Verify your student status



Download and Install GitHub Desktop

- <https://desktop.github.com/>
- Helpful graphic user interface (GUI) for Git
- Available for Windows and macOS.

Let's get started!

Add a repository to GitHub Desktop to start collaborating

🔍 Filter your repositories



Your Repositories

- 🖨️ NiubilityDiu/BayesInferenceEEGBCI
- 🖨️ NiubilityDiu/Bayesian-Signal-Matching-JASA
- 🔗 NiubilityDiu/EEG-DL
- 🔗 NiubilityDiu/bbci_public
- 🖨️ NiubilityDiu/bios-584-sample-repo
- 🔗 NiubilityDiu/conditional-neural-process
- 🔗 NiubilityDiu/dl-eeg-tutorial
- 🖨️ NiubilityDiu/ggplot



Create a Tutorial Repository...



Clone a Repository from the Internet...



Create a New Repository on your Local Drive...



Add an Existing Repository from your Local Drive...



ProTip! You can drag & drop an existing repository folder here to add it to Desktop



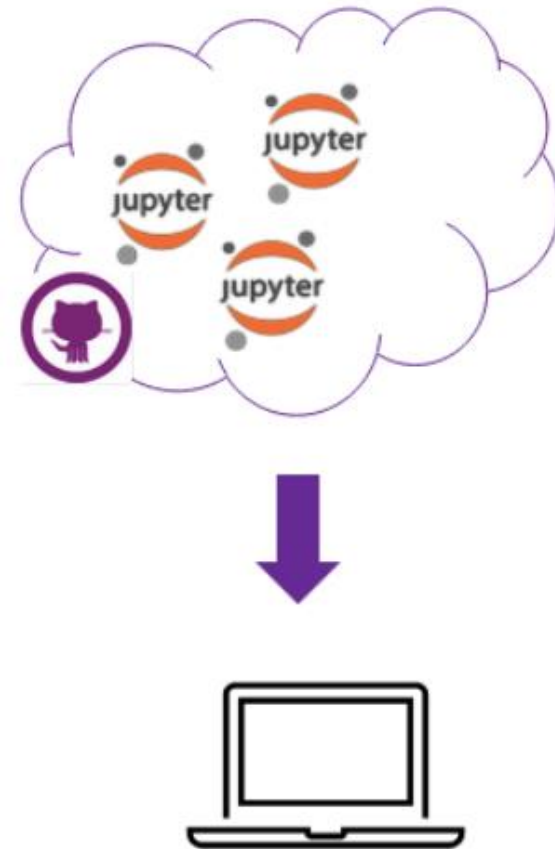
You should see a similar page to this when you first click on the GitHub application.

Access and Edit Remote Repo

- Access: Download a remote GitHub repository to your local computer to work on it
- Edit: Make local changes to the repository and update them to the cloud
- Two ways:
 - Cloning
 - Forking – Use forking in this course

Cloning

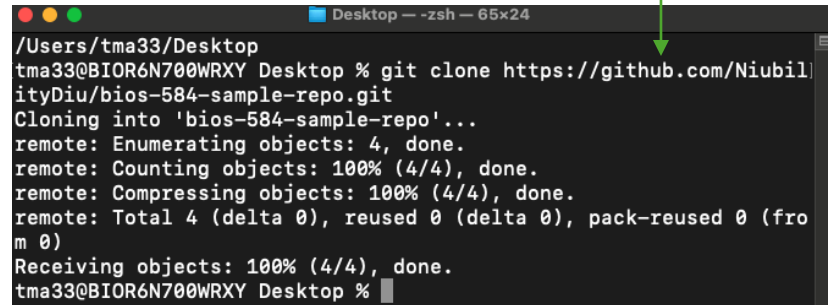
- Make a local copy of a repository
- Download a repository to your local computer
- Unlike forks, clones reference the original repository.
 - you cannot push changes to it unless you have permissions from the owner



Clone Example

- Example repo:
 - <https://github.com/NiubilityDiu/BIOS-584>
- Can clone the repo using GitHub desktop
 - Does not create a remote copy of the repo in my GitHub page

Sorry that I changed the name.

A terminal window titled 'Desktop - zsh - 65x24' showing the execution of a git clone command. The command is 'git clone https://github.com/NiubilityDiu/bios-584-sample-repo.git'. The output shows the cloning process into a directory named 'bios-584-sample-repo', including enumerating, counting, and compressing objects, and finally receiving the objects. A green arrow points from the text 'Sorry that I changed the name.' to the repository name in the command.

```
/Users/tma33/Desktop
tma33@BIOR6N700WRXY Desktop % git clone https://github.com/NiubilityDiu/bios-584-sample-repo.git
Cloning into 'bios-584-sample-repo'...
remote: Enumerating objects: 4, done.
remote: Counting objects: 100% (4/4), done.
remote: Compressing objects: 100% (4/4), done.
remote: Total 4 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
Receiving objects: 100% (4/4), done.
tma33@BIOR6N700WRXY Desktop %
```

Clone Example

- If user cloning the repo have write access, they can replace files and folders in the remote GitHub repo
- The purpose of cloning is to contribute directly to the original repo or work offline

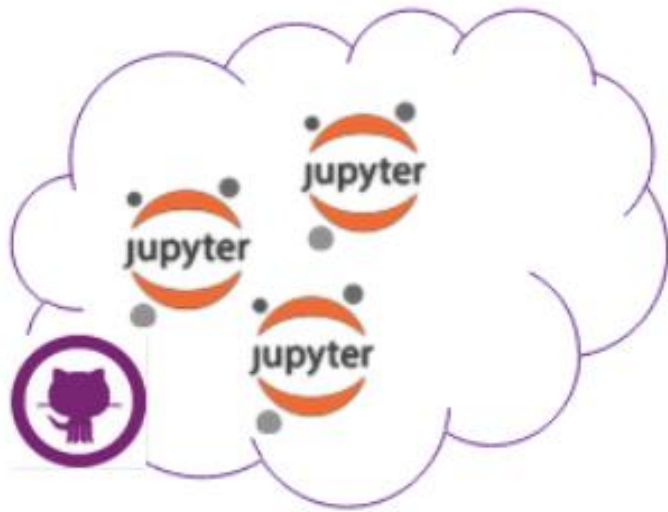
The screenshot shows a GitHub repository named "BIOS-584" (Public) by user "NiubilityDiu". The repository has 1 branch, 0 tags, and 5 commits. The commit history table shows:

File	Commit Message	Time
LICENSE	Initial commit	2 weeks ago
README.md	Update README.md	28 minutes ago
test.ipynb	test	28 minutes ago
test.py	test	28 minutes ago

The README file is selected, showing the title "BIOS-584: Python Programming (Non-BIOS)". The content includes a welcome message and a description of the course, which covers virtual environment setup, Jupyter Notebook, data types, control flow, object-oriented programming, and graphical user interface-driven applications. The course examples are drawn from diverse areas such as simple graphics creation, image manipulation, electronic health records, and electrophysiological sensor data.

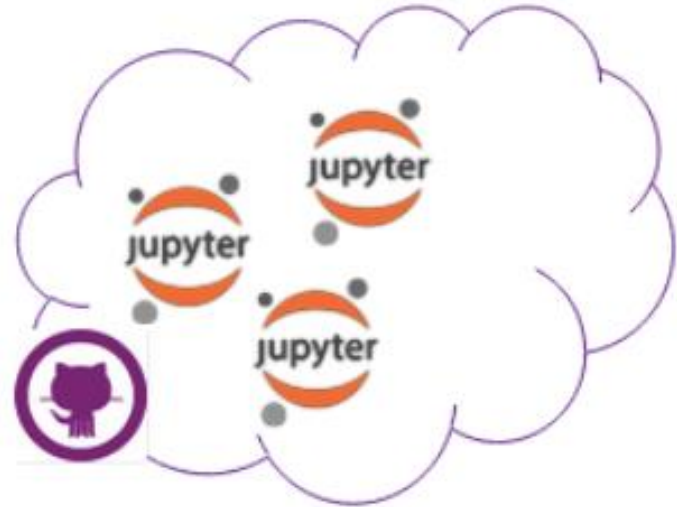
On the right side, there are sections for "About" (A sample repository for teaching purposes), "Releases" (No releases published), "Packages" (No packages published), and "Languages" (Jupyter Notebook 96.4%, Python 3.6%).

Cloning Example



github.com/student1/bios-584-sample-repo

CLONE

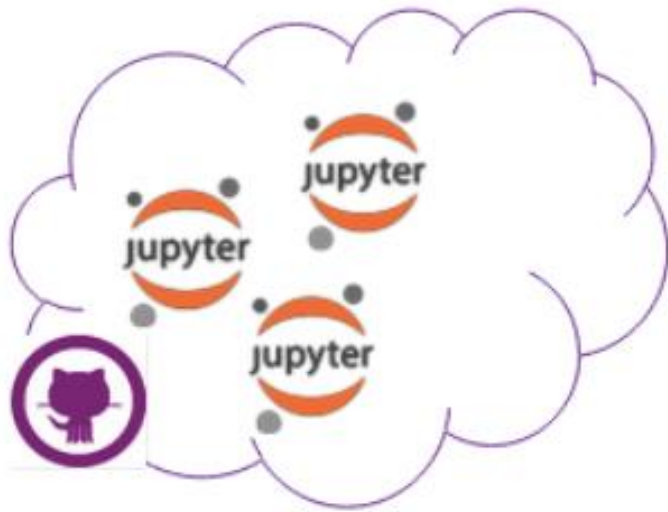


github.com/student2/bios-584-sample-repo

CLONE

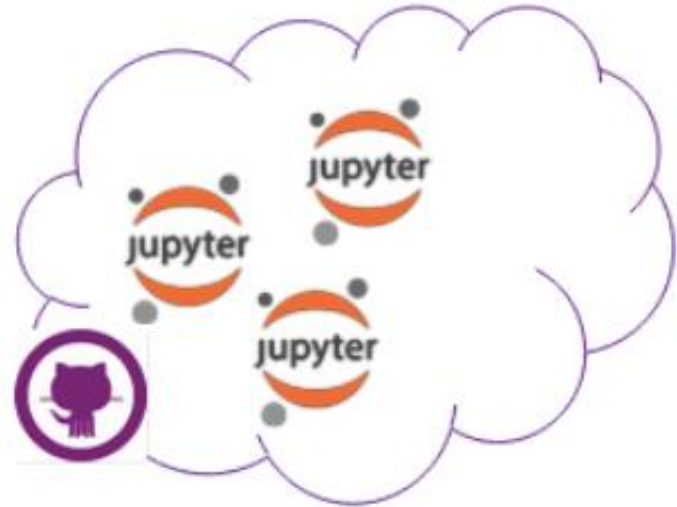


Cloning Example



github.com/student1/bios-584-sample-repo

PUSH



github.com/student2/bios-584-sample-repo

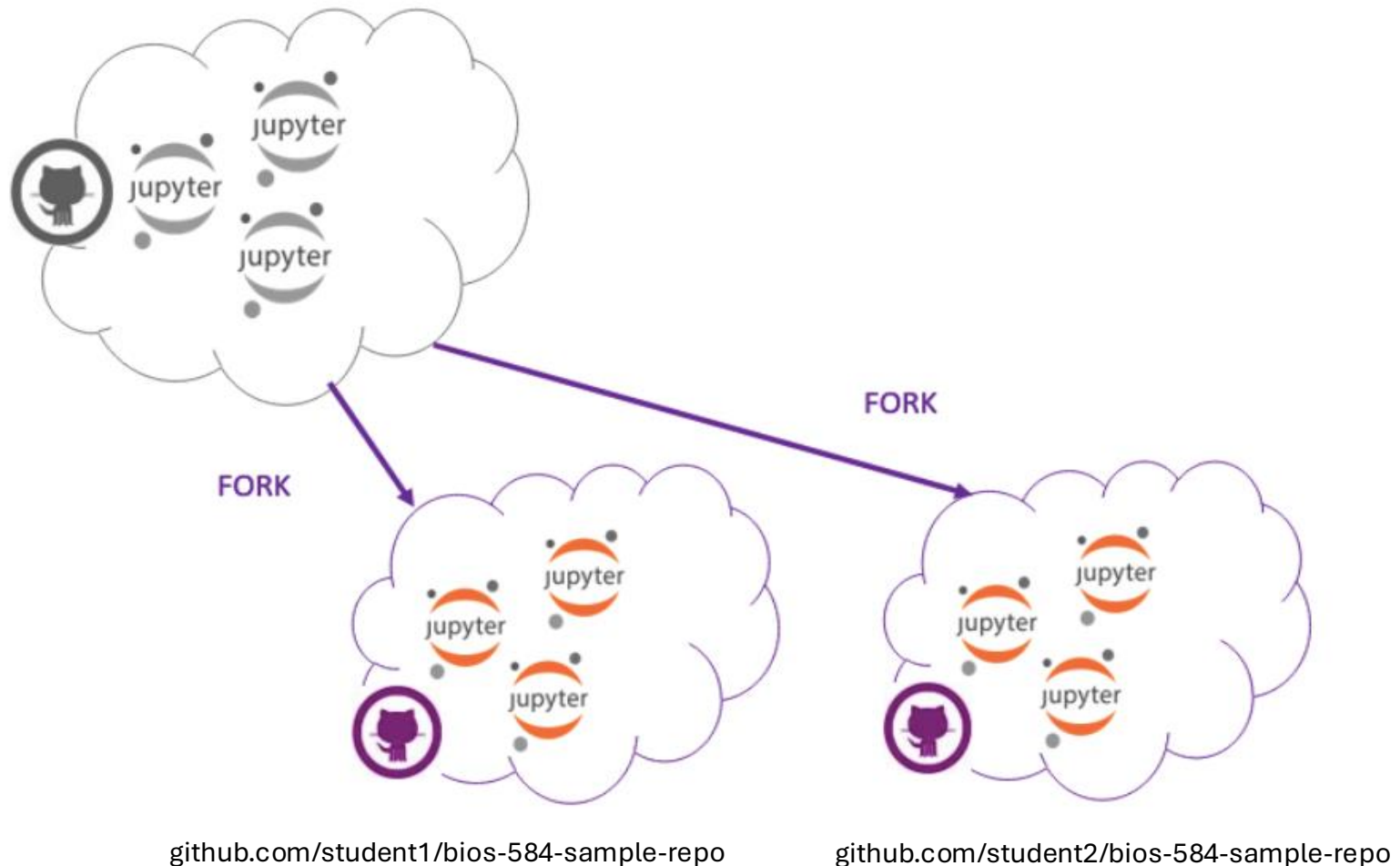
PUSH



Forking

- Create your own copy of a repository in your remote GitHub page
- You can contribute changes to your copy without affecting the original repository.
- Often used to create a personal version of a project for custom modifications or development
 - You can then submit a pull request to the original repository to suggest changes

Forking Illustration



Forking Example

- Fork the repo using the GitHub page
 - Create a remote copy of the repo on your GitHub
 - Then clone the repo to the local computer and work on it
 - Push changes to your remote repo
 - Or submit a pull request to the original repo to suggest changes
- You cannot fork your own repo.
- Click on “fork” button and select the destination if you belong to multiple organizations.



Forking

- The changes made by each student are not shared across different websites.
- Over time, the repos could look different.

Comparing cloning and forking

Feature	Cloning	Forking
Local Copy	Yes	No (Initially only on GitHub)
Direct Collaboration	Yes (if granted with permission)	No (requires pull requests, (PRs))
Synchronization	Yes (with original repo)	Yes (can fetch updates from the original)
Control	Limited (depend on permissions)	Full (over the forked copy)
Use Case	Contributing directly, local development	Independent development, contributing via PRs
Includes	All files, branches, commit history	All files, commit history, but no issues or PRs

Remove cloned and forked repos

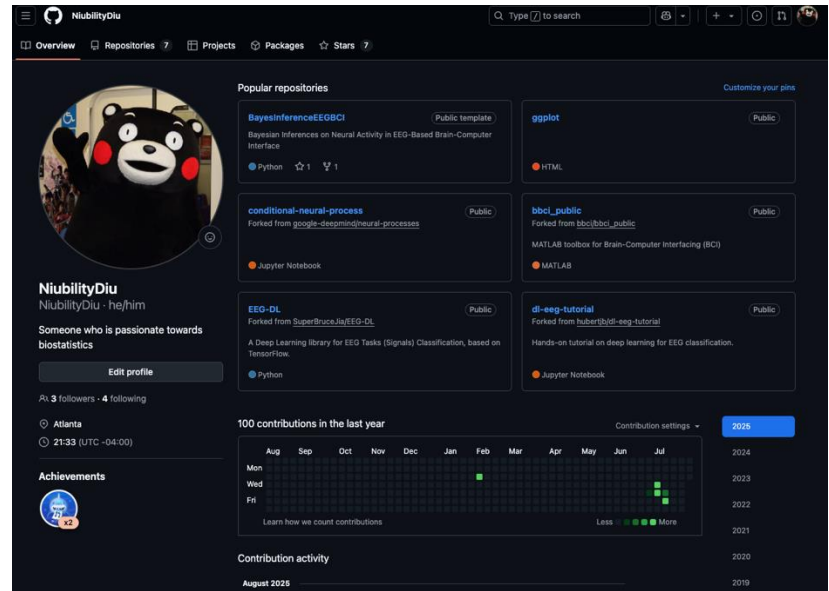
- If you no longer need your cloned or forked repos, you can delete the local copy.
- Deleting the local copy does not affect the remote repo.
- You can also delete the remote repo if you have written access to it.
 - Always be careful with deleting files in GitHub!

Questions?

Step-by-Step Instruction

Step 1: Create a GitHub Account

- <https://github.com/>
- Free educational account with Emory email address
- Be careful with your username as it is visible to the public

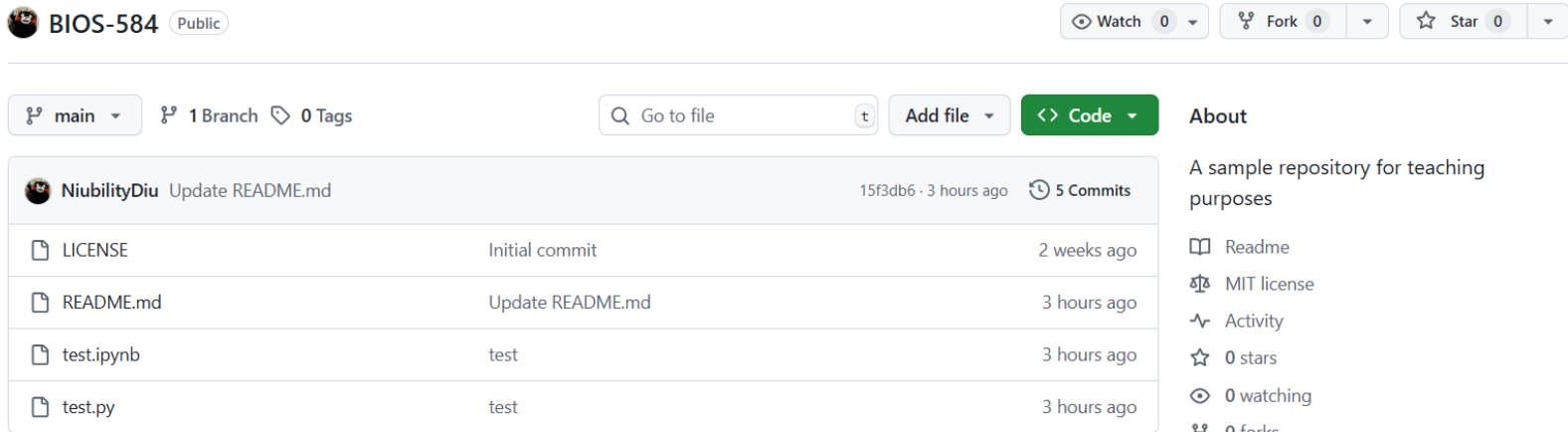


This is my profile page.

Step 2: Download and Install GitHub Desktop

- <https://desktop.github.com/>
- Helpful graphic user interface (GUI) for Git
- Available for Windows and macOS.

Step 3: Fork Repo Online



BIOS-584 Public

Watch 0 Fork 0 Star 0

main 1 Branch 0 Tags

Go to file Add file Code

NiubilityDiu Update README.md 15f3db6 · 3 hours ago 5 Commits

LICENSE	Initial commit	2 weeks ago
README.md	Update README.md	3 hours ago
test.ipynb	test	3 hours ago
test.py	test	3 hours ago

About

A sample repository for teaching purposes

- Readme
- MIT license
- Activity
- 0 stars
- 0 watching
- 0 forks

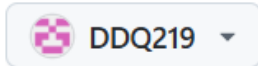
Step 4: Create a new Fork

Create a new fork

A *fork* is a copy of a repository. Forking a repository allows you to freely experiment with changes without affecting the original project.

Required fields are marked with an asterisk ().*

Owner *



Repository name *

/ BIOS-584

✓ BIOS-584 is available.

By default, forks are named the same as their upstream repository. You can customize the name to distinguish it further.

Description (optional)

A sample repository for teaching purposes

☒ Copy the `main` branch only

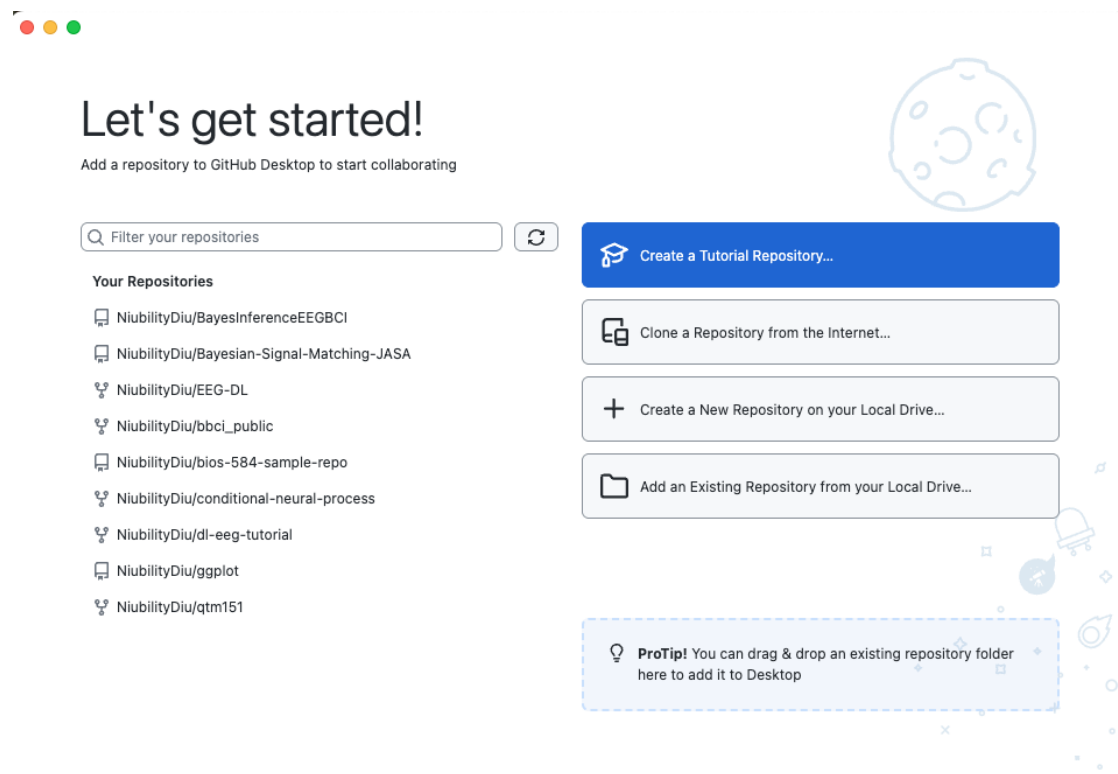
Contribute back to NiubilityDiu/BIOS-584 by adding your own branch. [Learn more.](#)

You are creating a fork in your personal account.

Create fork

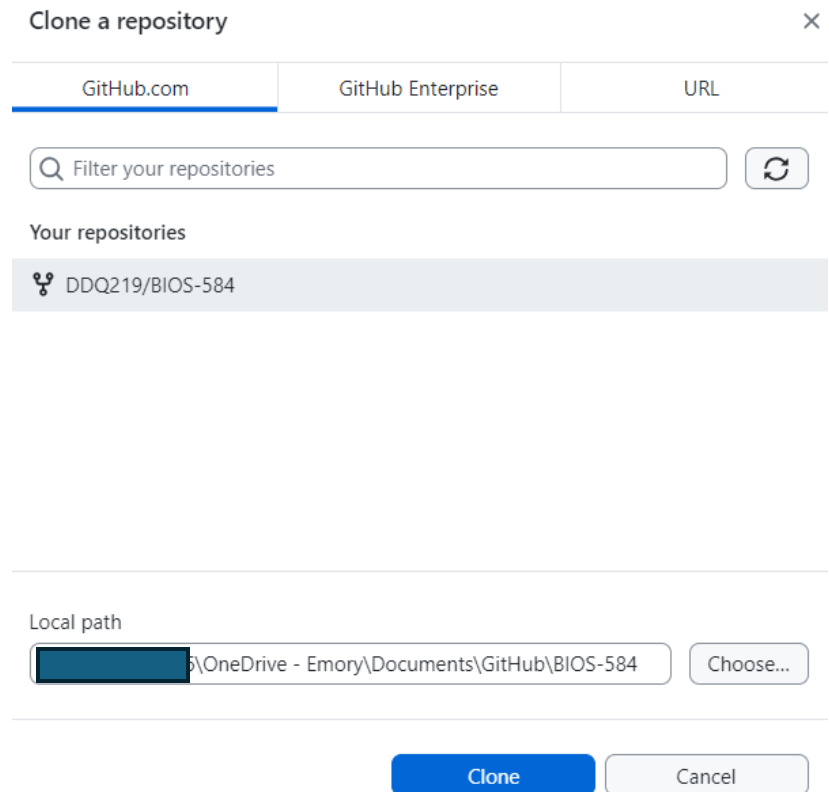
Step 5: Clone Repo to Desktop

- Click “Clone a Repository from the Internet” and select the one you forked.



Step 5: Clone Repo to Desktop

- The forked one will appear here.
 - Note that the repo directory is under your name instead of mine!
- Refresh if necessary.



The screenshot shows a 'Clone a repository' dialog box with a close button (X) in the top right corner. It features three tabs: 'GitHub.com' (selected), 'GitHub Enterprise', and 'URL'. Below the tabs is a search bar labeled 'Filter your repositories' with a magnifying glass icon and a refresh button. Under the 'Your repositories' section, a repository named 'DDQ219/BIOS-584' is listed with a fork icon. At the bottom, there is a 'Local path' section with a text input field containing a file path and a 'Choose...' button. The file path is partially obscured by a dark blue rectangle. At the very bottom, there are two buttons: 'Clone' (blue) and 'Cancel' (light gray).

Clone a repository

GitHub.com GitHub Enterprise URL

Filter your repositories

Your repositories

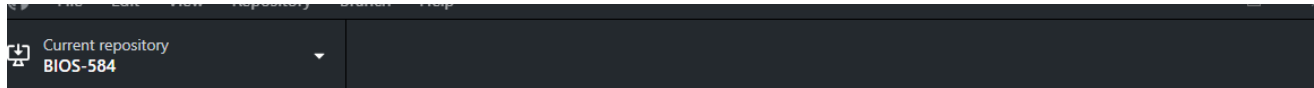
DDQ219/BIOS-584

Local path

OneDrive - Emory\Documents\GitHub\BIOS-584 Choose...

Clone Cancel

Step 5: Clone Repo to Desktop



 Cloning BIOS-584



Resolving deltas: 100% (3/3), done.

Step 5: Clone Repo to Desktop

- Click “contribute to the parent project”

How are you planning to use this fork? ×

This repository is a fork. How do you plan to use it?

☒ **To contribute to the parent project**
We will help you contribute to the **NiubilityDiu/BIOS-584** repository

☐ **For my own purposes**
We will help you contribute to the **DDQ219/BIOS-584** repository

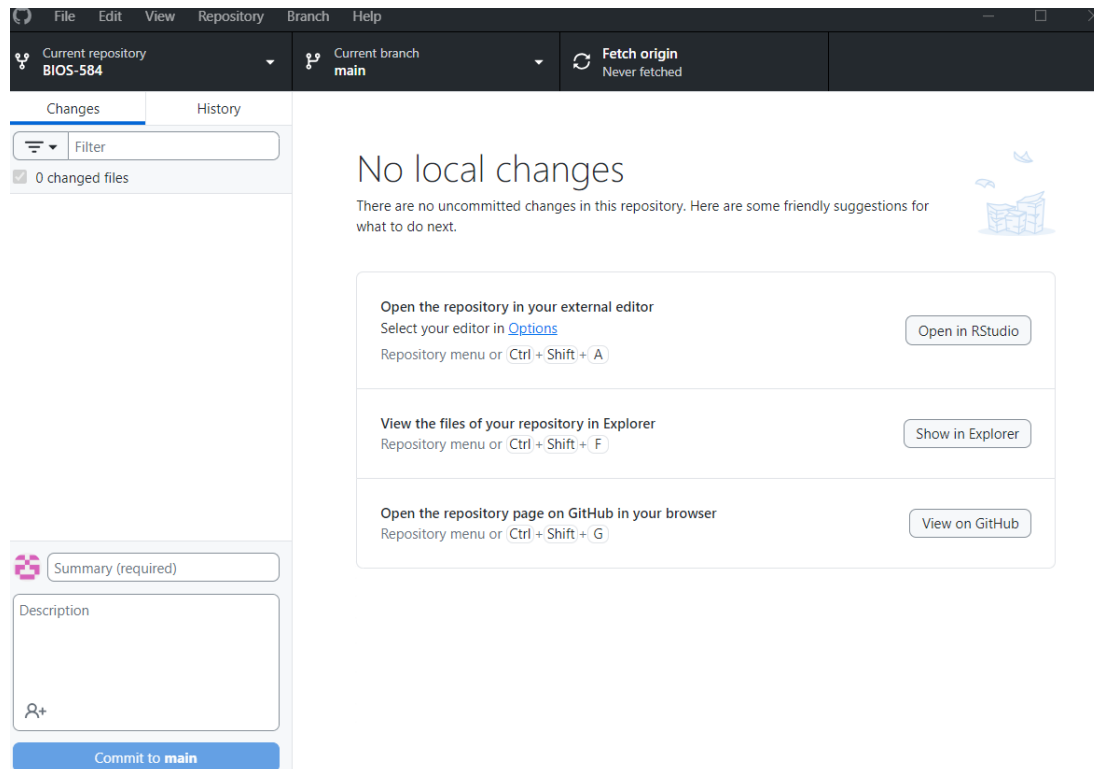
- Pull requests targeting **NiubilityDiu/BIOS-584** will be shown in the pull request list.
- Issues will be created in **NiubilityDiu/BIOS-584**.
- "View on GitHub" will open **NiubilityDiu/BIOS-584** in the browser.
- New branches will be based on **NiubilityDiu/BIOS-584**'s default branch.
- Autocompletion of user and issues will be based on **NiubilityDiu/BIOS-584**.

Continue

Cancel

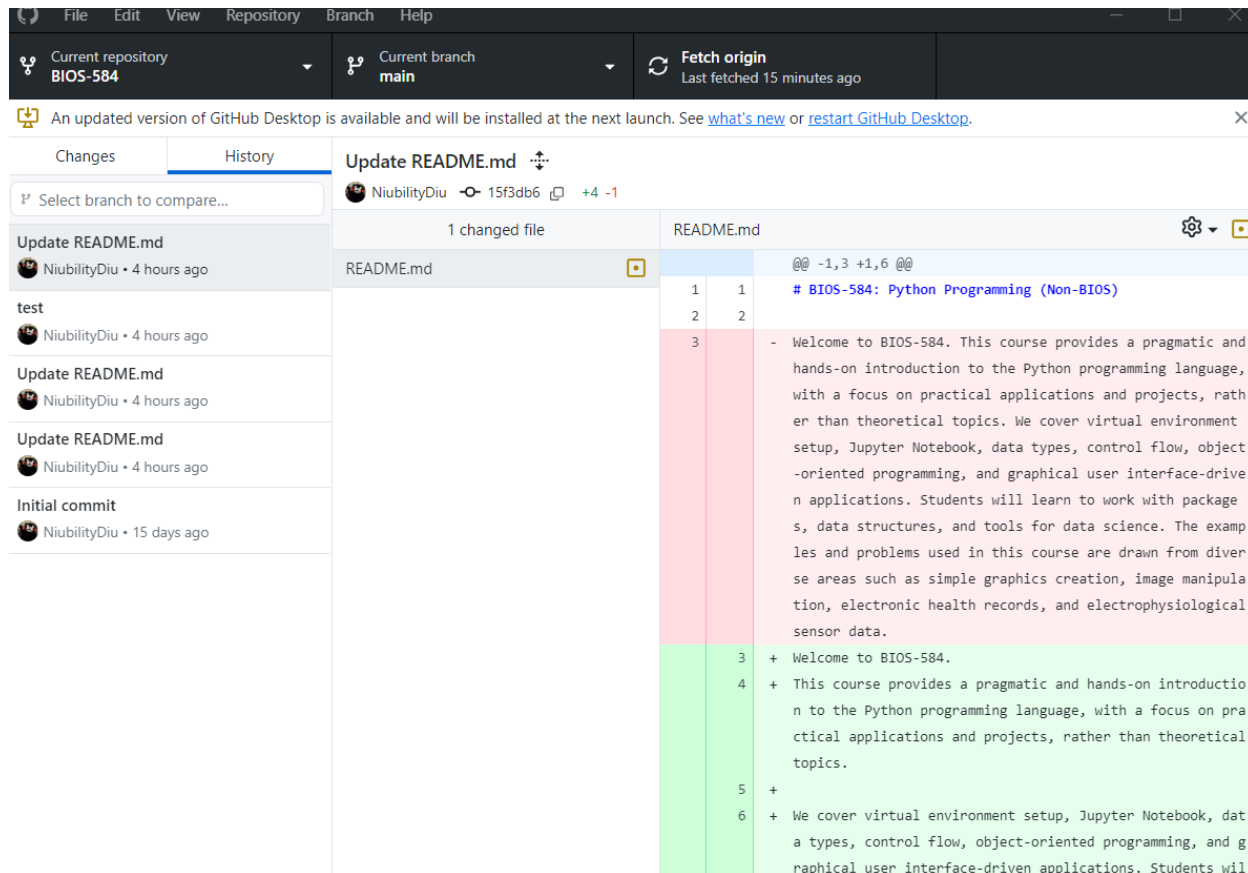
Step 5: Clone Repo to Desktop

- You should achieve the following status.



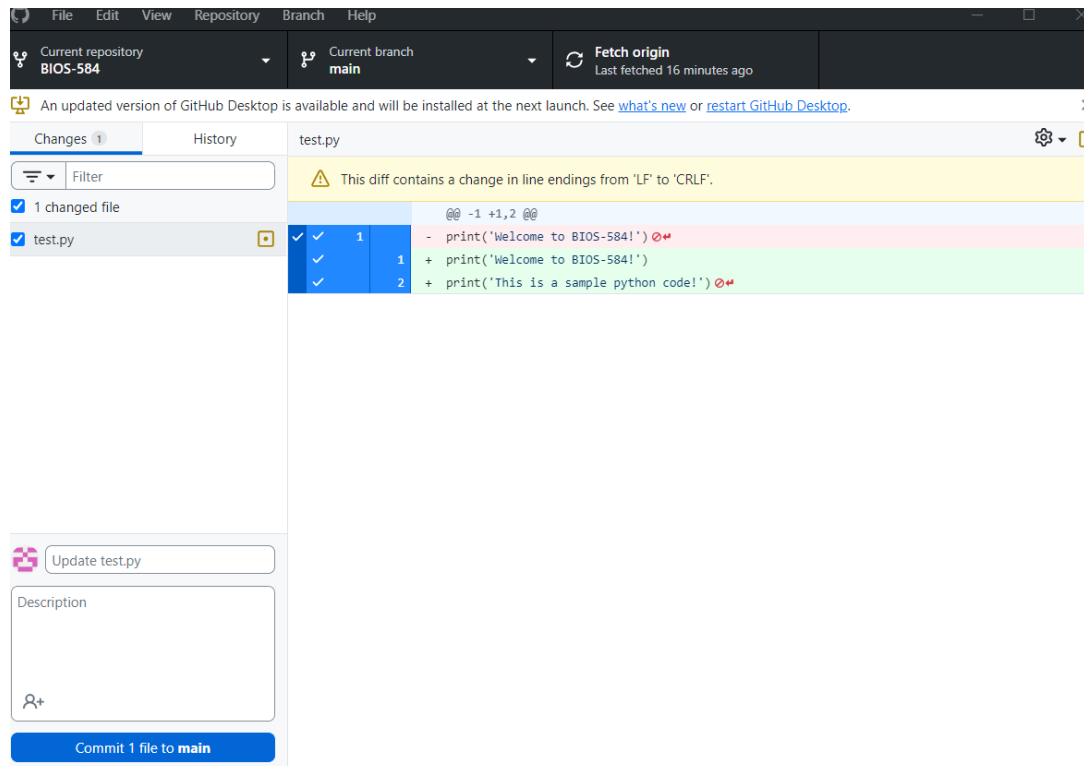
Step 6: Add Changes

- You will see History of my work.



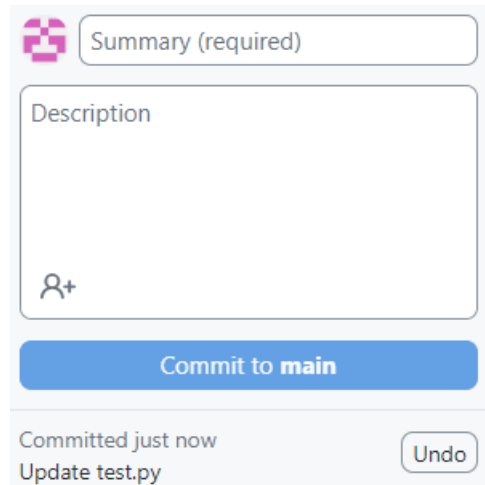
Step 6: Add Changes

- We create a “test.py” under the GitHub folder.
- GitHub desktop detects the change.



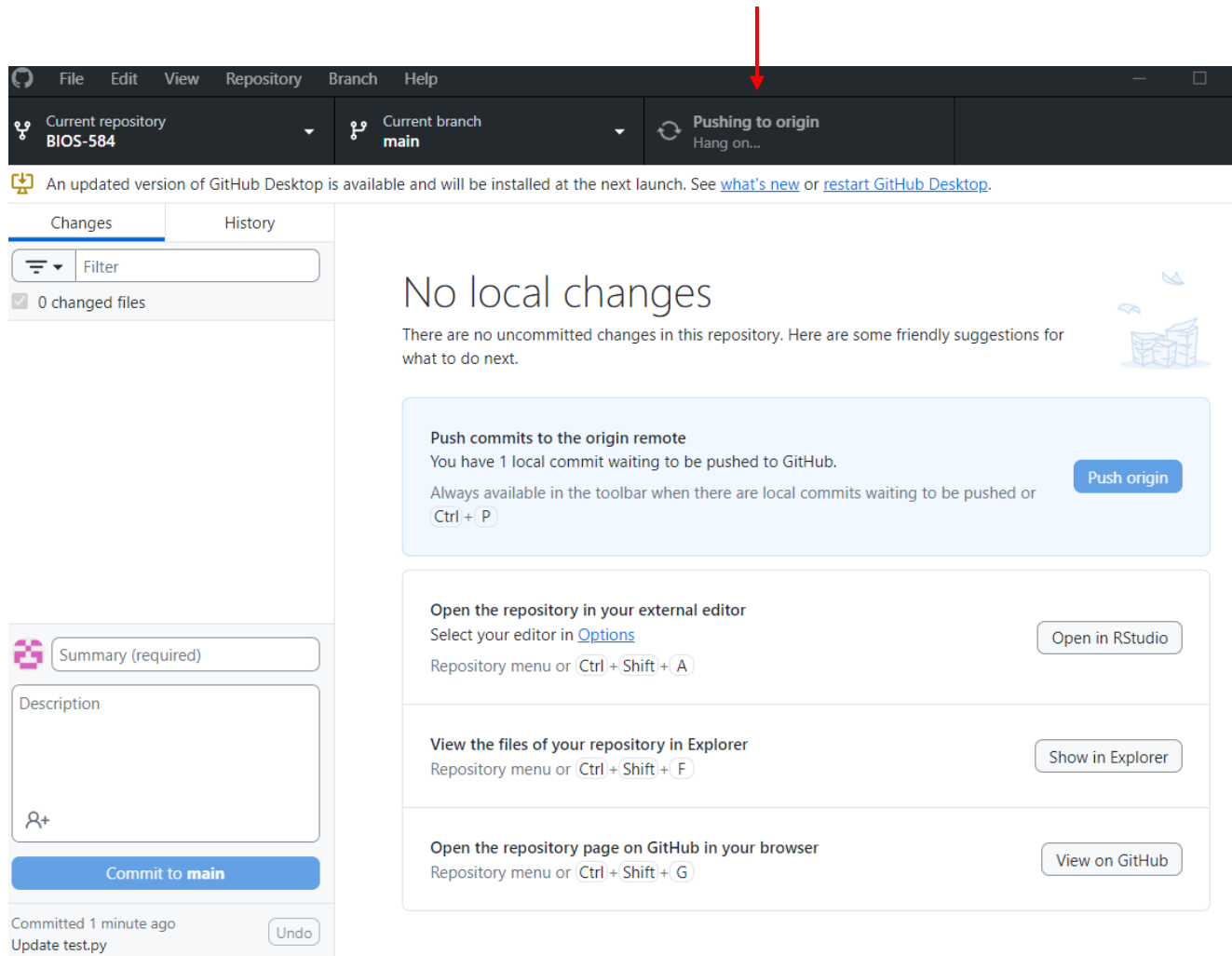
Step 7: Commit changes

- We commit this change.
- It is recommended to write a brief description for future tracking purposes.



The screenshot shows a commit interface. At the top left is a pink logo. To its right is a text input field labeled "Summary (required)". Below this is a large text area labeled "Description". At the bottom left of the description area is a person icon with a plus sign. Below the description area is a blue button labeled "Commit to main". At the bottom of the interface, it says "Committed just now" and "Update test.py", with an "Undo" button to the right.

Step 8: Push Changes



Step 8: Push Changes

- Your changes will be reflected in History.
- You should be able to see the new files on your GitHub repository online as well.

