GitHub 101: Keep better track of your code

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About Me

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Universiteit
Leiden

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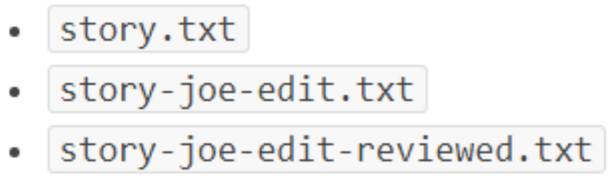
What will you learn today?

- Basic git terminology and commands
- Working with local and remote repositories
- Working with branches
- Pull request
- Bonus: Solve conflicts when merging

Why is tracking your changes important?

- What is your current method of keeping track of your changes to your scripts?
- How do you collaborate with someone on a project?



- `story.txt`
- `story-joe-edit.txt`
- `story-joe-edit-reviewed.txt`

Solution: Git & GitHub

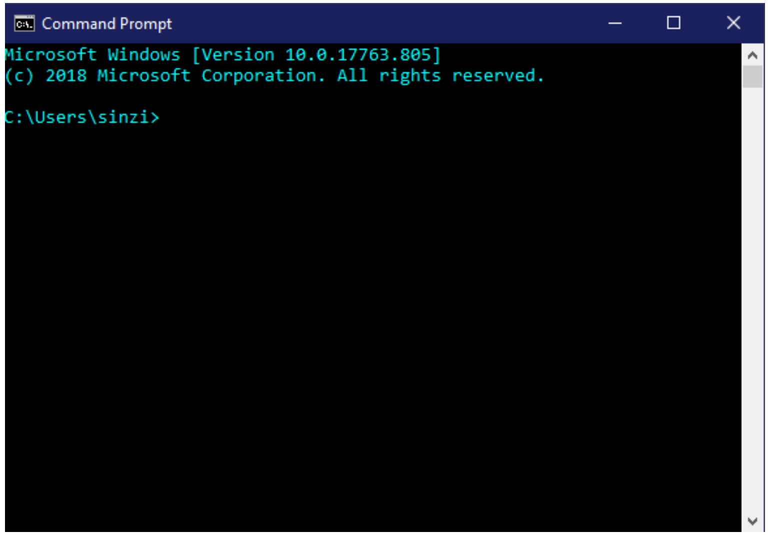
- Git: version control system
  - Records changes to files over time
  - e.g. save with different names.
- GitHub:
  - GitHub is a code hosting platform for version control and collaboration.
  - It lets you and others work together on projects from anywhere.
- Getting started:
  - With an UI: GitDesktop
  - UI has the basic functionalities
  - Does not require coding
  - (-) sometimes you can run into problems that are not solvable with UI:
    - → command line in shell/command prompt

Command prompt/Shell?

- Command window where you can type in command lines to be executed

- Useful when you want to automate tasks, execute scripts, etc..

- Git commands should start with *git* followed by what you want to do
  - This tutorial will include both UI and command lines in git, side by side.



```
Microsoft Windows [Version 10.0.17763.805]
(c) 2018 Microsoft Corporation. All rights reserved.

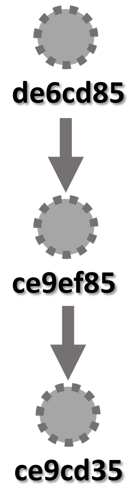
C:\Users\sinzi>
```

What are repositories (repos)?

- Similar to folder where you keep all the files necessary for a project
    - Files to keep track of
    - Files to share with others
- E.g.: images, videos, spreadsheets, data sets, scripts – anything your project needs.
- A *README*, or a file with the project description.
- Managing repositories:
    - Remote repositories (e.g.,GitHub)
        - Owner = You
        - Owner = Someone else (e.g., Open source projects)
    - Local repositories – (your computer(s))
        - Owner = You

How are your changes tracked?

- You start with an empty repo to which you add your files.
- When you save these changes you perform a *commit*.
- Git takes care of:
  - **Who** made the commit
  - **When** that commit was made
  - Assigning an unique ID (hash) to every commit
- You take care of:
  - Code changes
  - Commit message
    - Description, reason for changing code
- Commits are built on top of each other

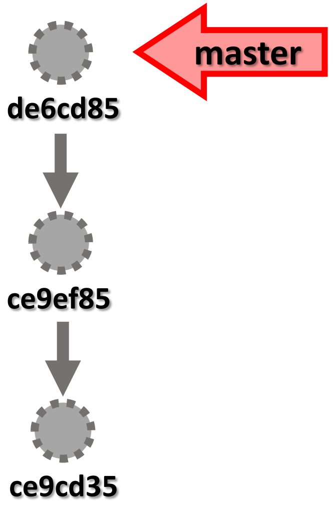


How are your changes tracked?

- *History* of your commits is tracked by a branching system.
- A *branch* is a label for a commit
  - Use: when you want to work on multiple versions of a script in parallel

  e.g.: Implement a new feature, bug fix, etc.

- The default branch is called *master*
- When switching from one branch to another we *checkout*.



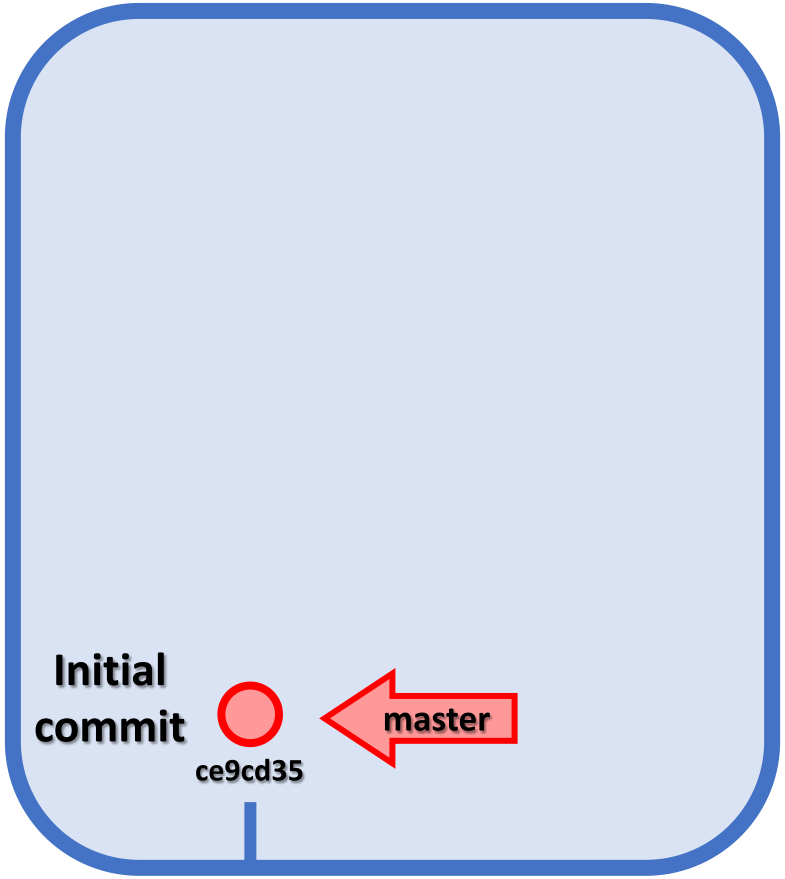
How are your changes tracked?

What happens when you create your remote repo?

- Readme file is created and added to the empty repo
- This will be the ***initial commit***
- This will be labeled as the default branch *master*

Remote Repo

GitHub



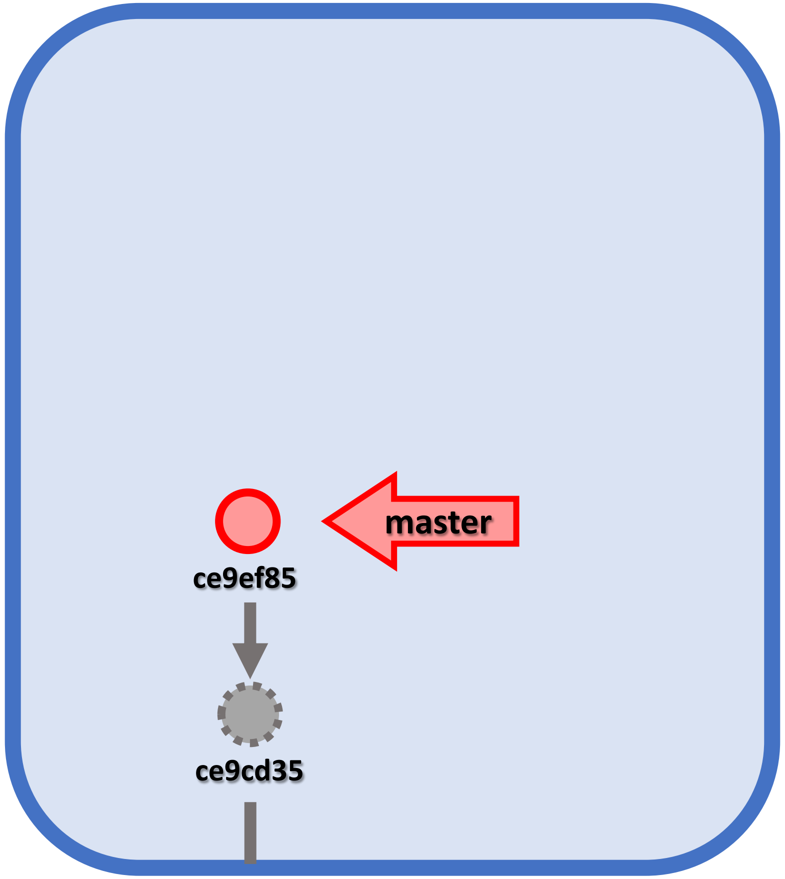
How are your changes tracked?

What happens when you make a change/commit?

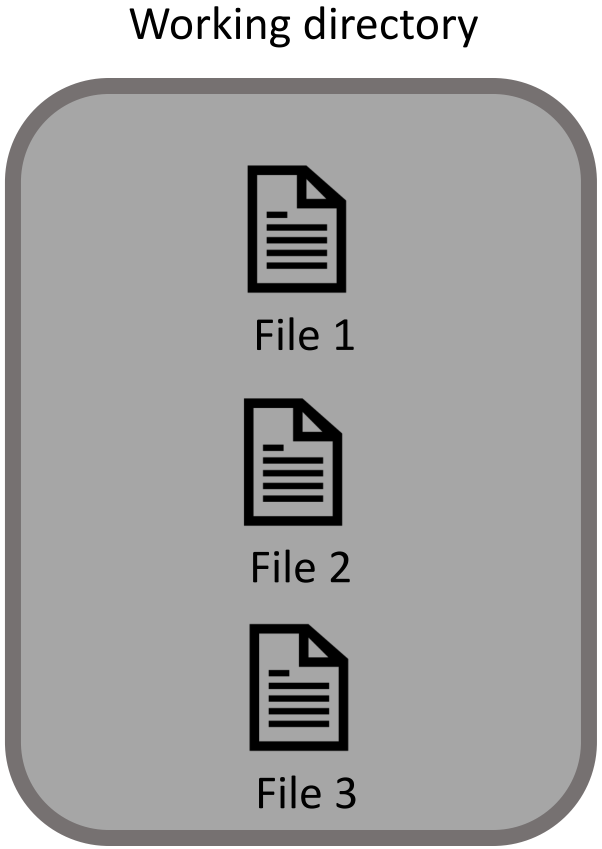
- Readme file is changed
- This will be the second commit
- Git:
  - Who, when, ID for commit
- You:
  - What, why (message)
- The branch *master* will go up one commit

Remote Repo

GitHub



The working areas of a repo



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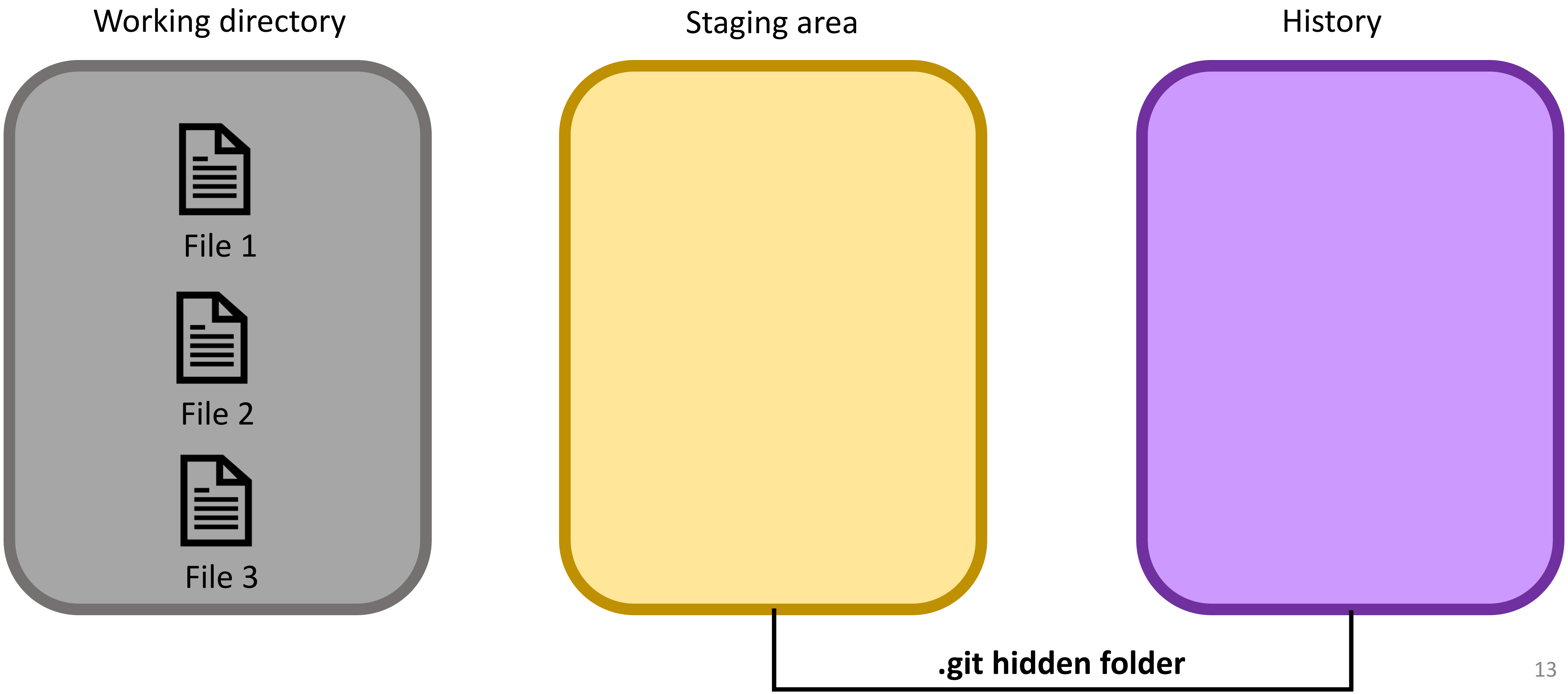

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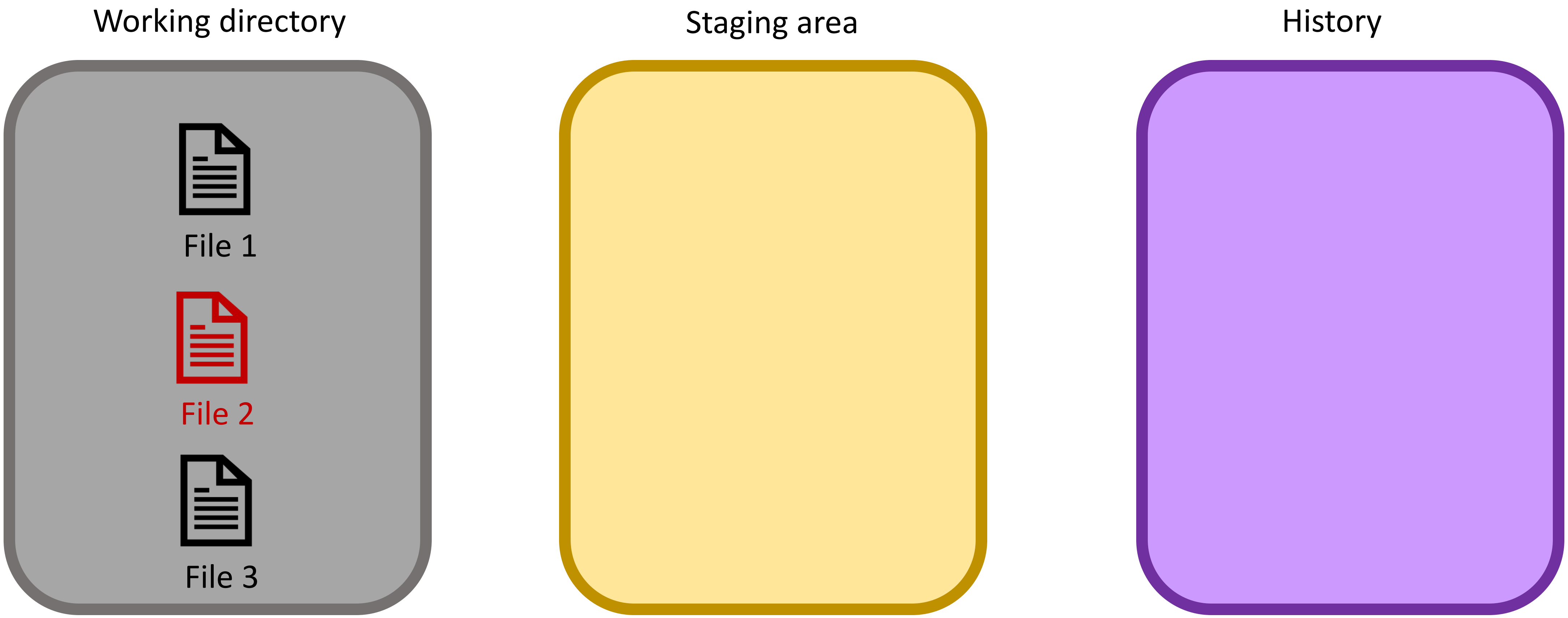

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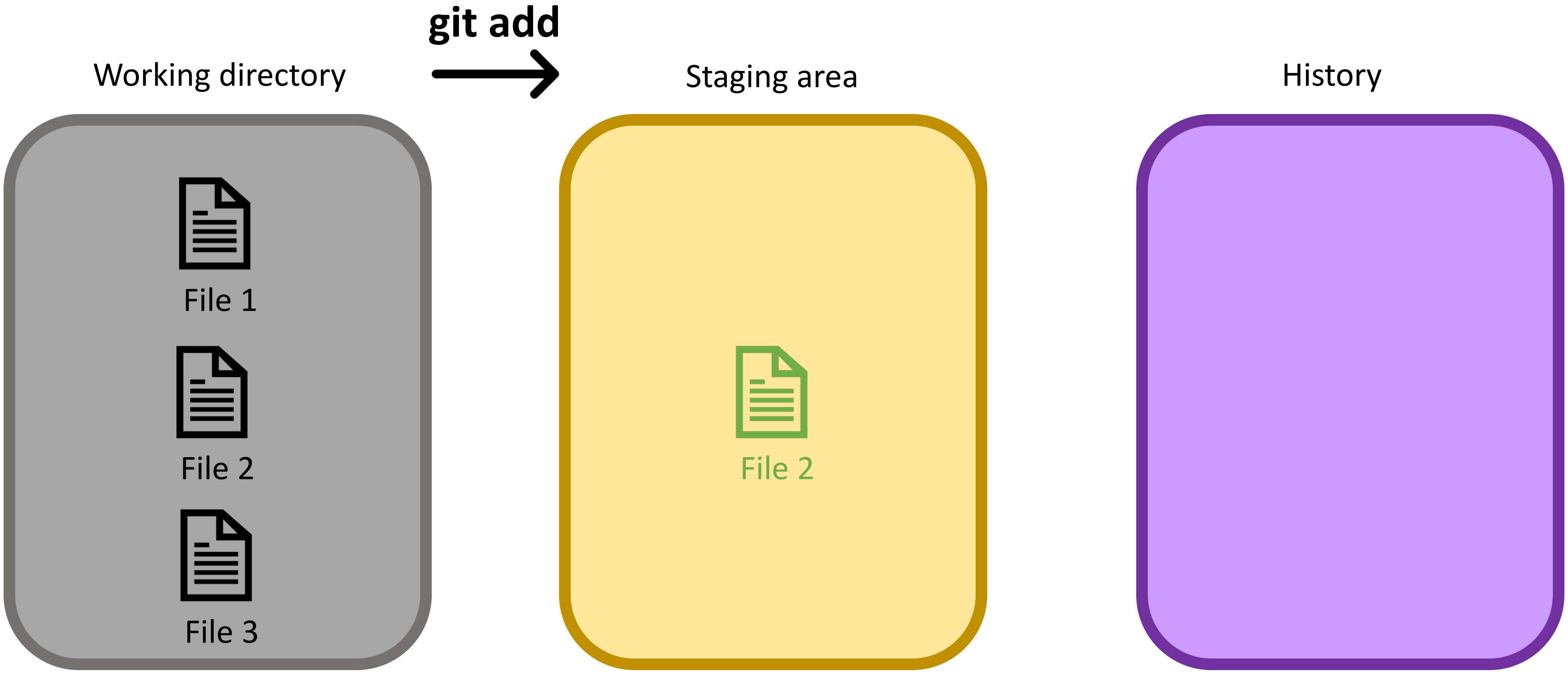

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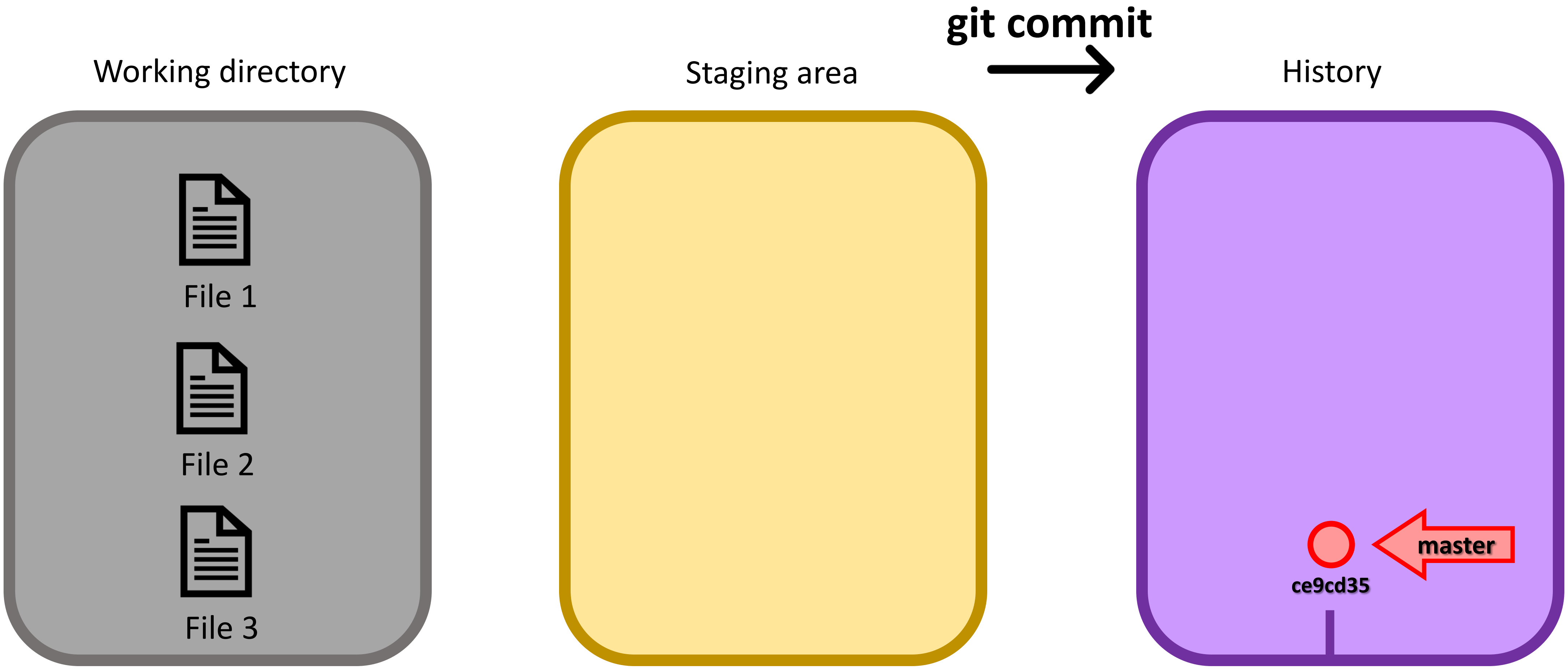

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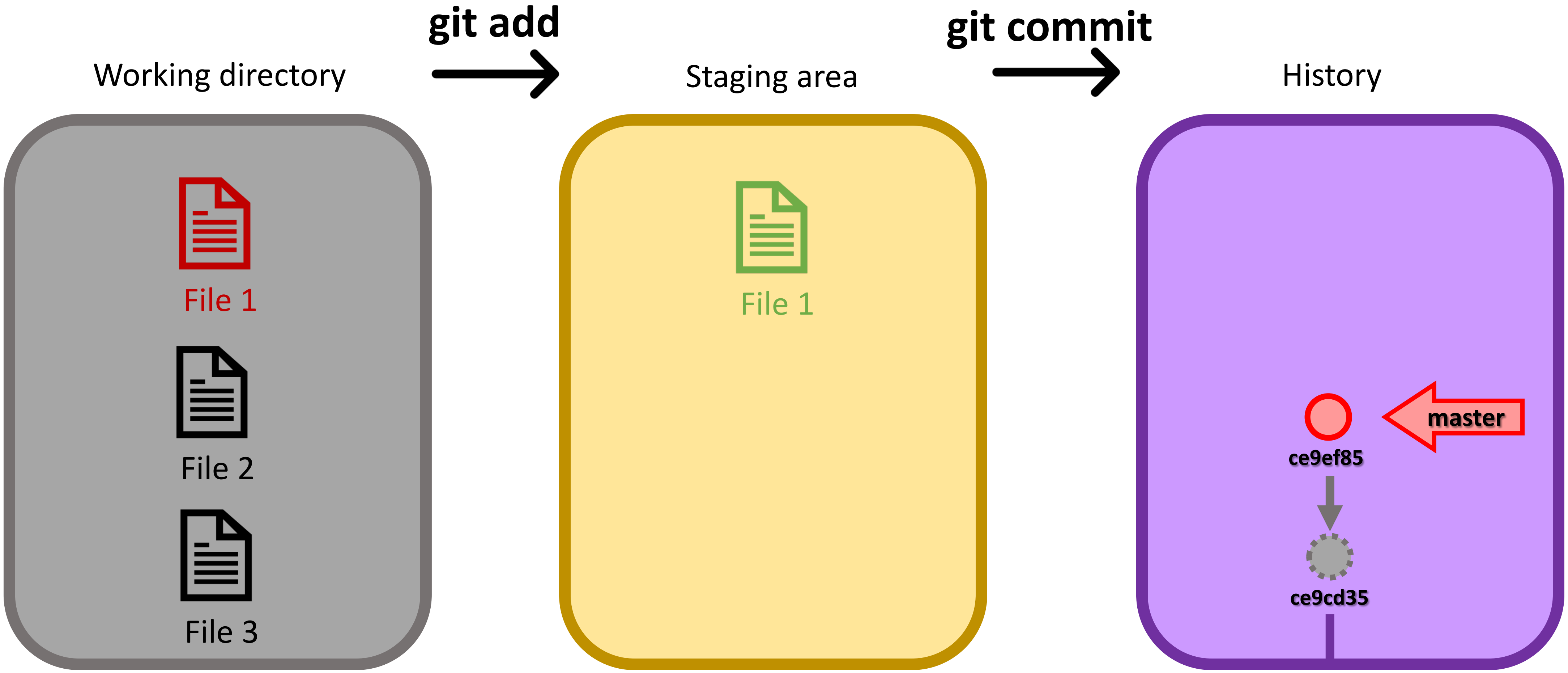
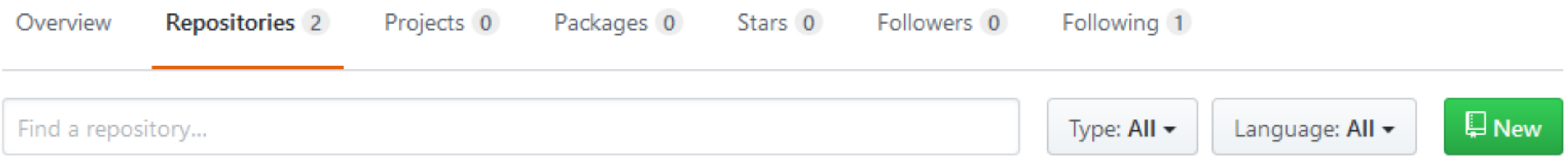


Basic git commands on GitHub

- Create remote repository on GitHub
- Make commits and look at the history
- Copy remote repository to your computer (clone)

Create a remote repo on GitHub

- Go to your profile on GitHub
- Select Repositories → click on New to create a new repo



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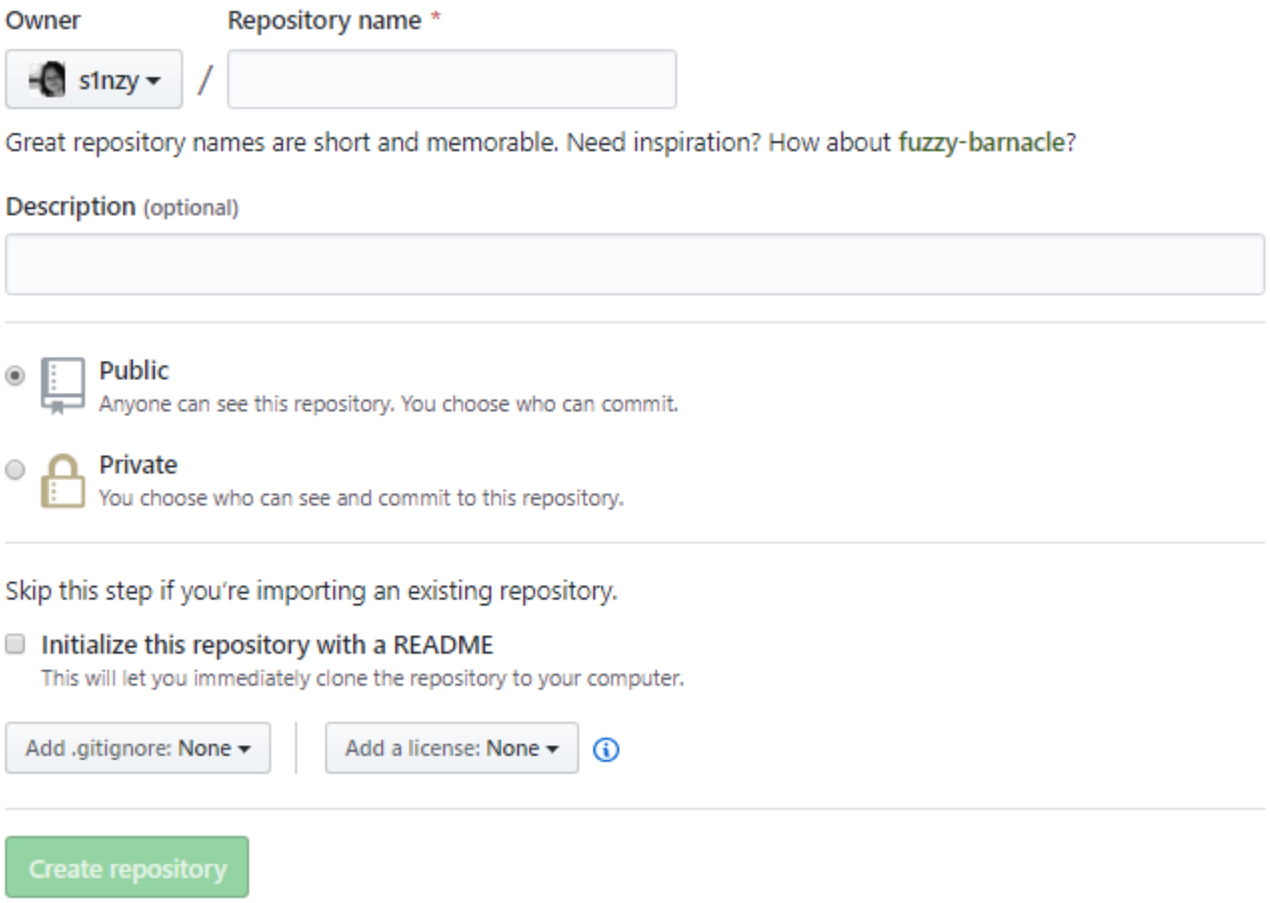


Owner: s1nzy ▾ / Repository name *

Great repository names are short and memorable. Need inspiration? How about fuzzy-barnacle?

Description (optional)

● Public
Anyone can see this repository. You choose who can commit.

○ Private
You choose who can see and commit to this repository.

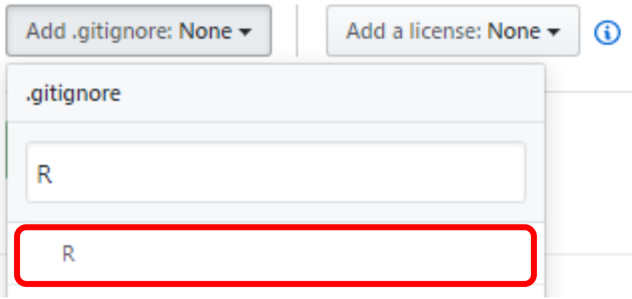
Skip this step if you're importing an existing repository.

□ Initialize this repository with a README
This will let you immediately clone the repository to your computer.

Add .gitignore: None ▾ | Add a license: None ▾

Create repository

- Repository name:
  - e.g., GitTutorial_SC_11
- Description:
  - Basics of Git and GitHub
- Public
- ✓*Initialize this repository with a README*
- Click on



Add .gitignore: None ▾ | Add a license: None ▾

.gitignore

R

R

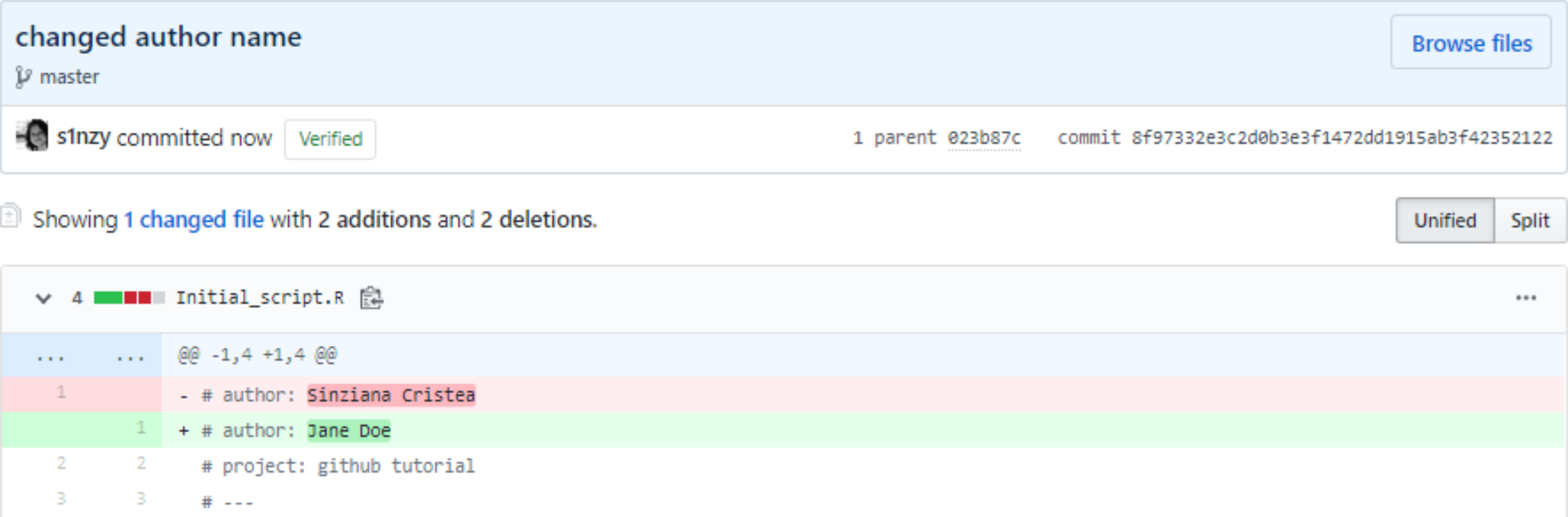
Commits in GitHub

- Change 1: Upload the R script you got in preparation for this workshop → Commit 1
- Change 2: Change the author name to your (nick)name→ Commit 2
    - Click on the R script name
    - You can see the content of the script
    - Click the *Edit* button on the right ✎
    - Change the author name

Checkout the history of our commits

- Go to your repository
- Click on the Rscript you just changed
- You should now see the content of the script
- Click the *History* button on the right
  - Who made the commits
  - When these were made
  - The unique ID numbers associated with each commit
- Click on the latest commit
  - Red background: the initial text
  - Green background: your change

Checkout the history of our commits



changed author name

master

s1nzy committed now Verified

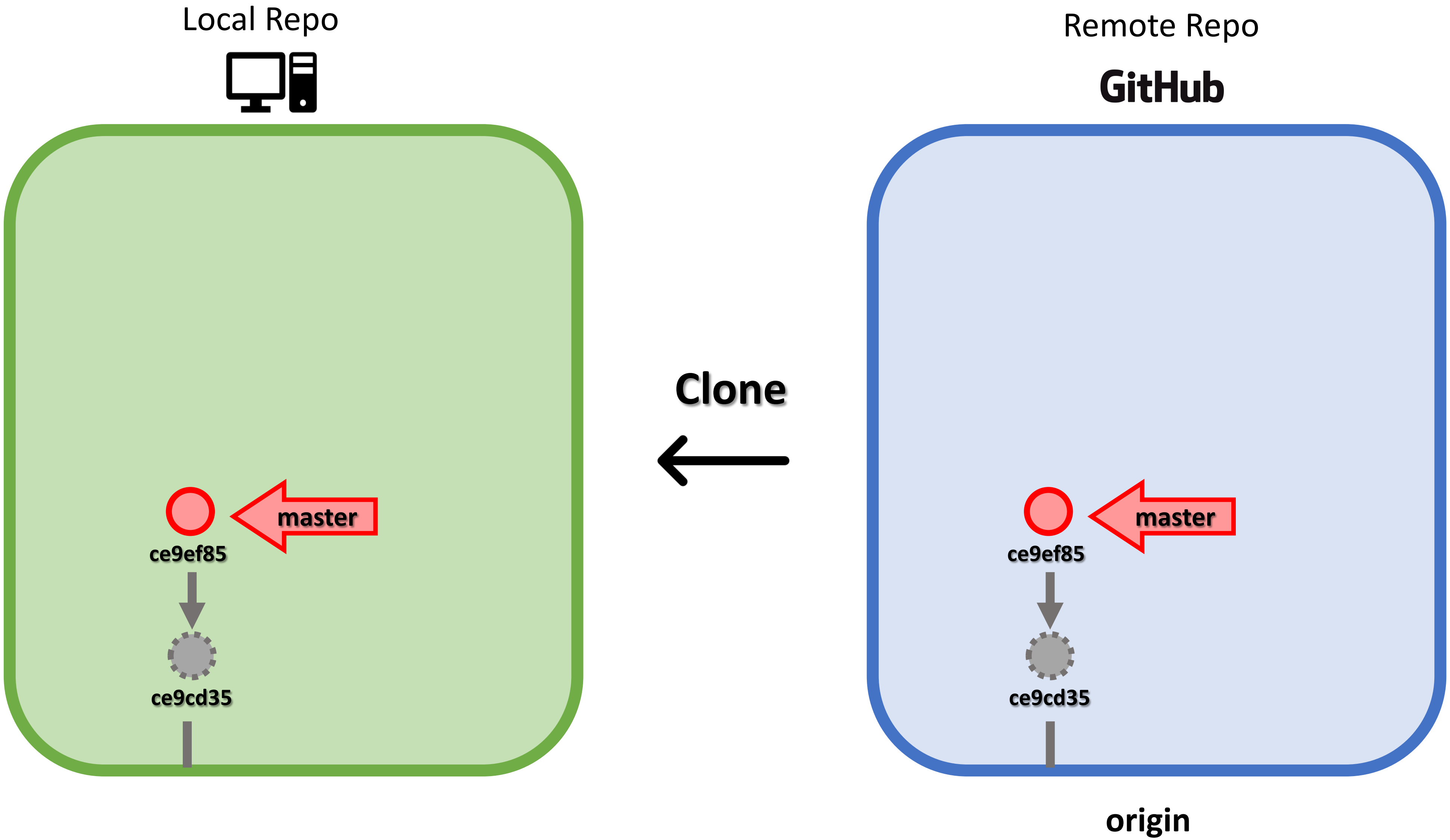
1 parent 023b87c commit 8f97332e3c2d0b3e3f1472dd1915ab3f42352122

Showing 1 changed file with 2 additions and 2 deletions.

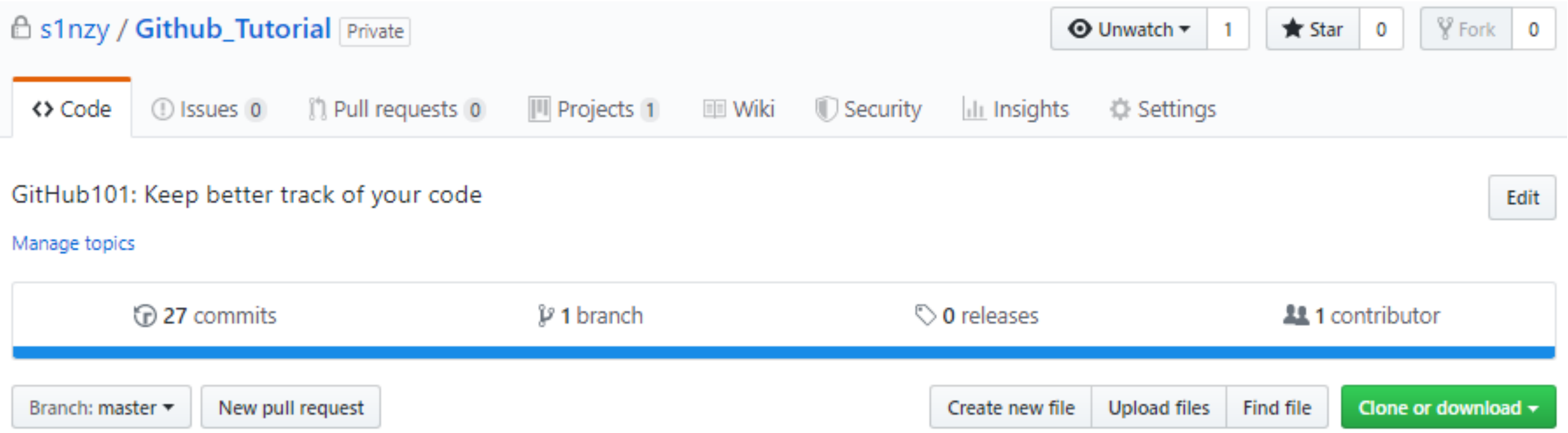
4 Initial_script.R

```
...   ...   @@ -1,4 +1,4 @@
 1          - # author: Sinziana Cristea
        1   + # author: Jane Doe
 2      2     # project: github tutorial
 3      3     # ---
```

Remote repo → Local repo



How to Clone with GitDesktop (UI)?



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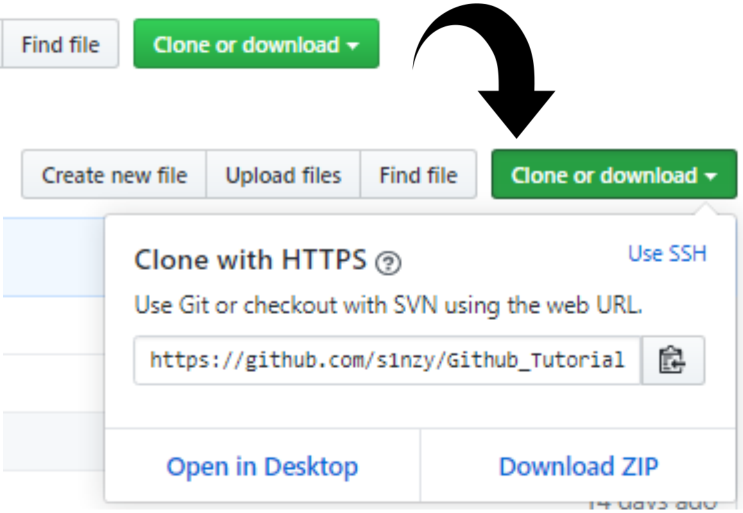


Use Git or checkout with SVN using the web URL.

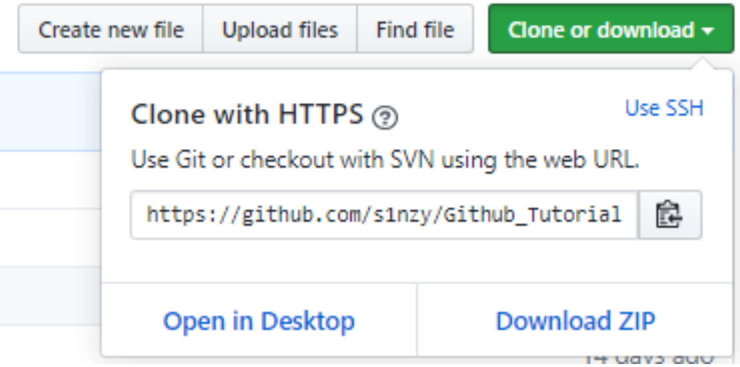
```
https://github.com/s1nzy/Github_Tutorial
```

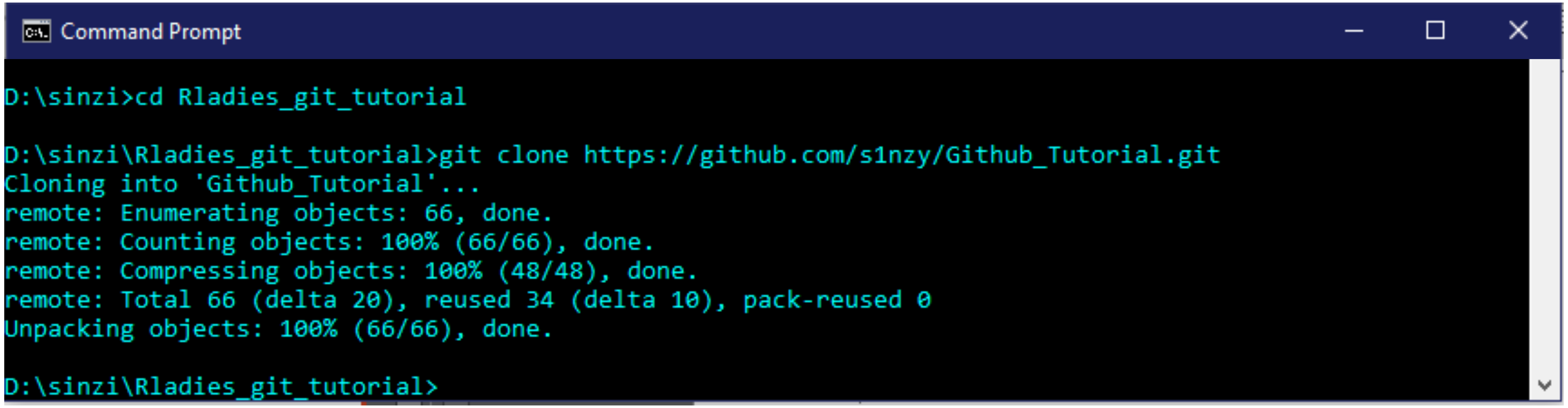
- Go to your GitHub repository
- Select the Code Tab
- Click on the *Clone or download* button
  - Open in Desktop ☜
  - Download ZIP

How to clone with the git command line?

- Go to the folder you want to clone the repo
- Command:

git clone https://github.com/s1nzy/Github_Tutorial.git





```
D:\sinzi>cd Rladies_git_tutorial

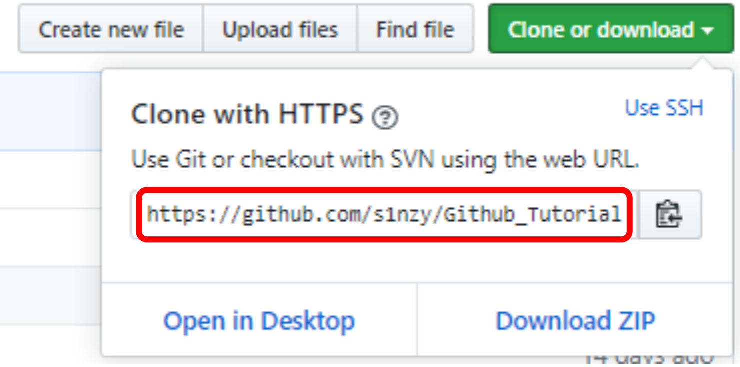
D:\sinzi\Rladies_git_tutorial>git clone https://github.com/s1nzy/Github_Tutorial.git
Cloning into 'Github_Tutorial'...
remote: Enumerating objects: 66, done.
remote: Counting objects: 100% (66/66), done.
remote: Compressing objects: 100% (48/48), done.
remote: Total 66 (delta 20), reused 34 (delta 10), pack-reused 0
Unpacking objects: 100% (66/66), done.

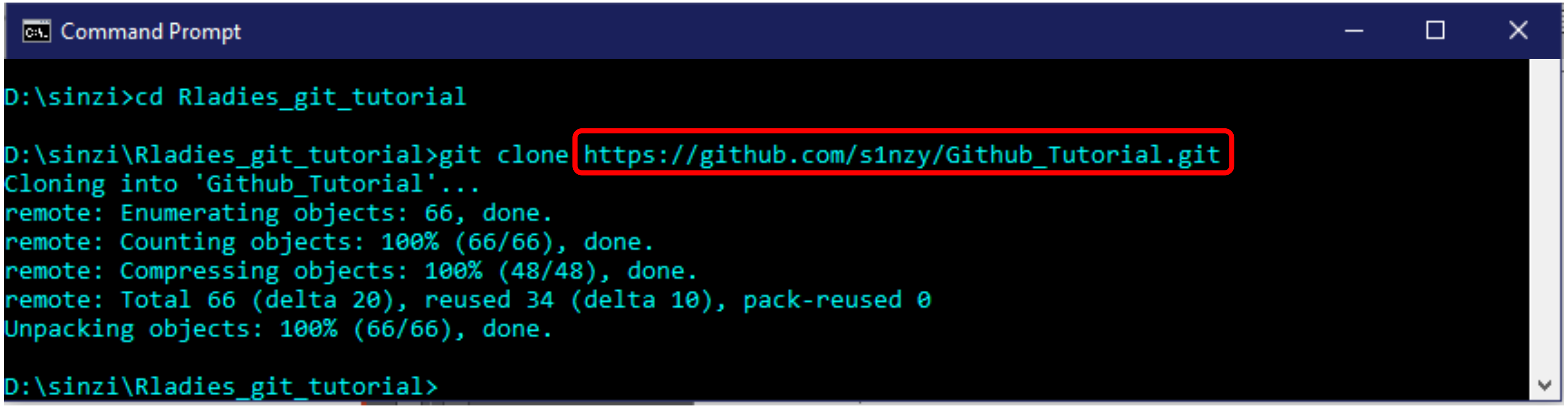
D:\sinzi\Rladies_git_tutorial>
```

How to clone with the git command line?

- Go to the folder you want to clone the repo
- Command:

git clone https://github.com/s1nzy/Github_Tutorial.git





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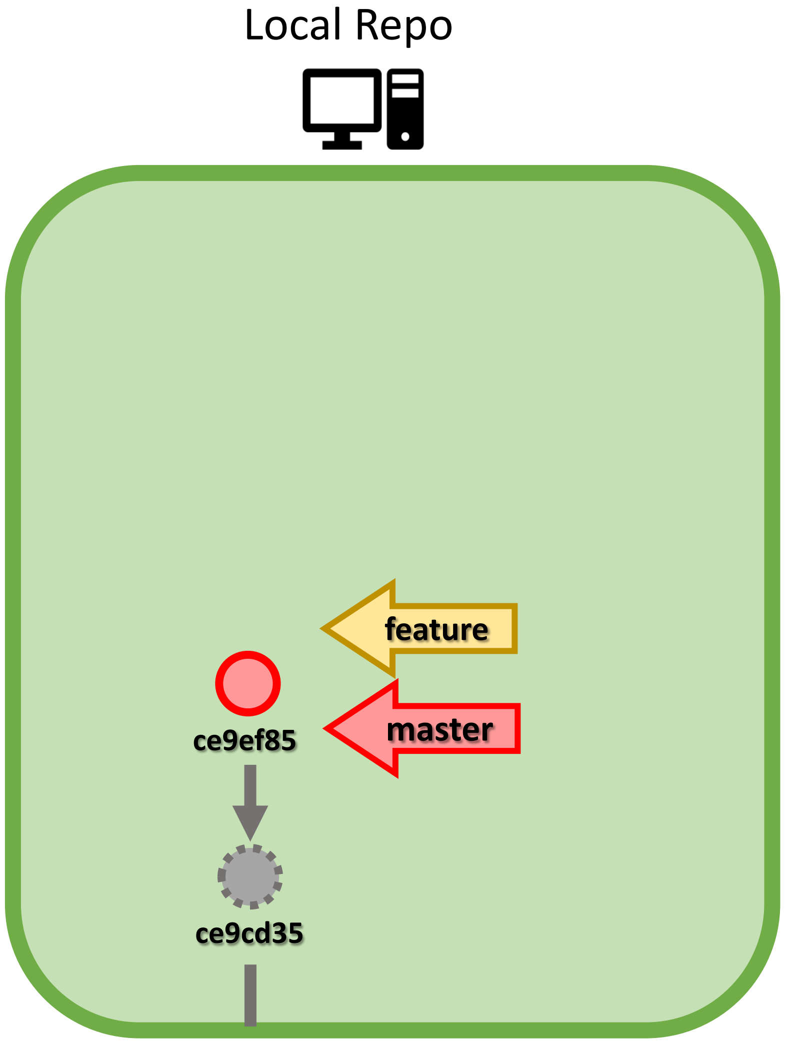
remote: Total 66 (delta 20), reused 34 (delta 10), pack-reused 0
Unpacking objects: 100% (66/66), done.

D:\sinzi\Rladies_git_tutorial>
```

Basic git commands on local repo

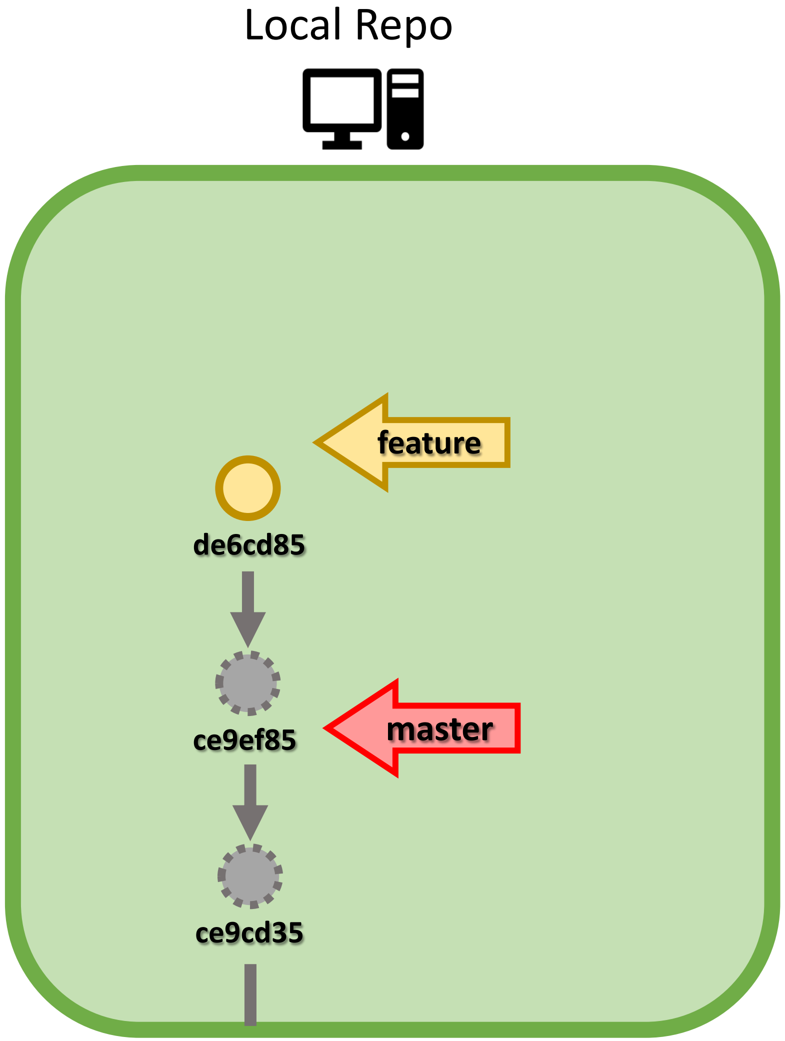
- Create a new branch
- Merge that branch into master branch
- Push local changes to remote repo

Branches & Merge



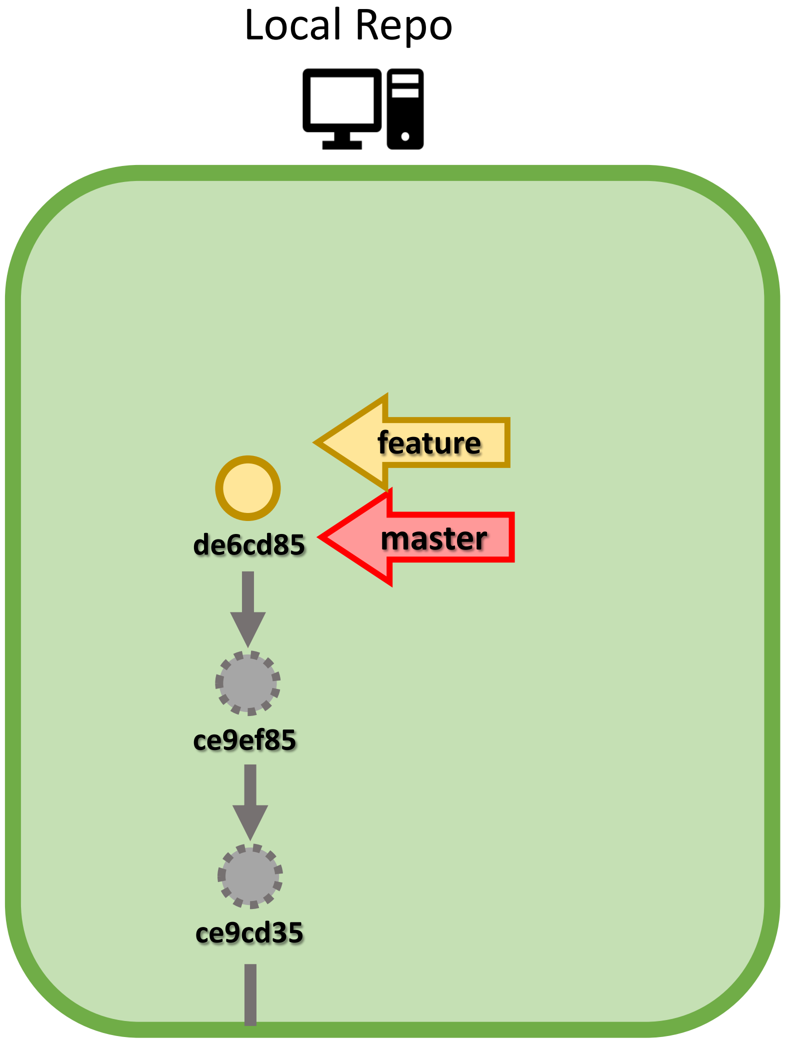
- Create a new branch called *feature*
  - master and feature will point to the same commit
- Switch to the branch *feature*
- Make a new commit

Branches & Merge



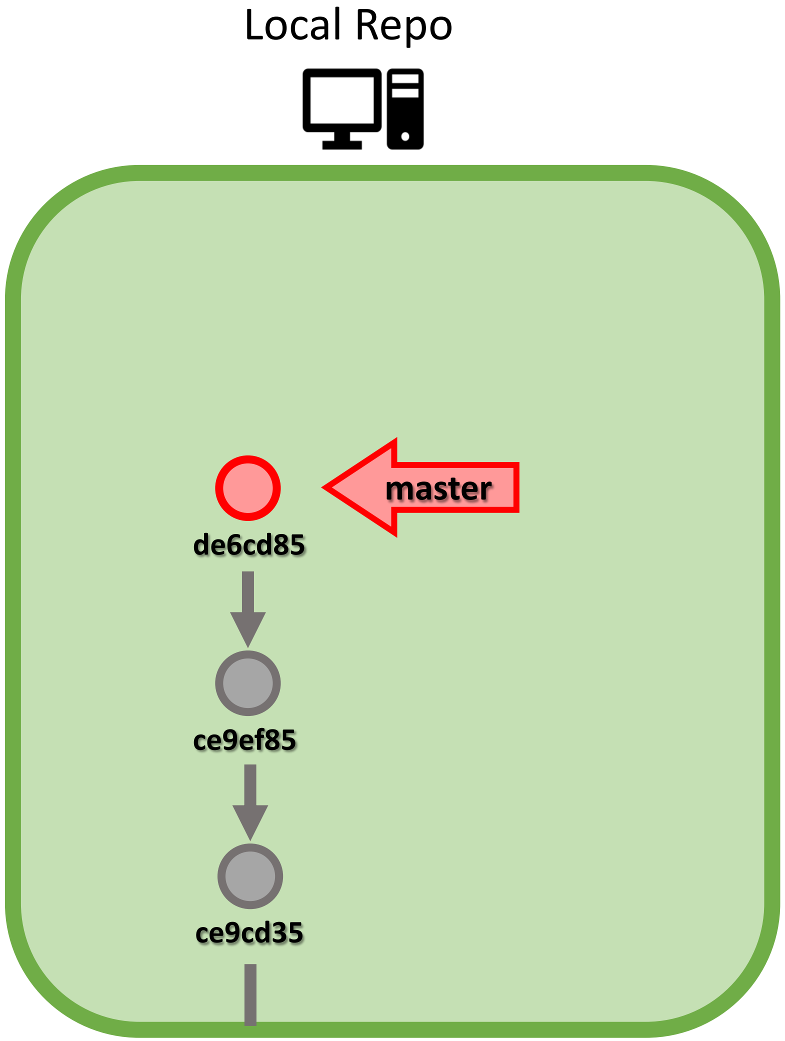
- Create a new branch called *feature*
  - master and feature will point to the same commit
- Switch to the branch *feature*
- Make a new commit
- Add changes from *feature* to *master* → Merge

Branches & Merge



- Create a new branch called *feature*
  - master and feature will point to the same commit
- Switch to the branch *feature*
- Make a new commit
- Add changes from *feature* to *master* → Merge
- Direct path between branches
  - Fast-forward merge

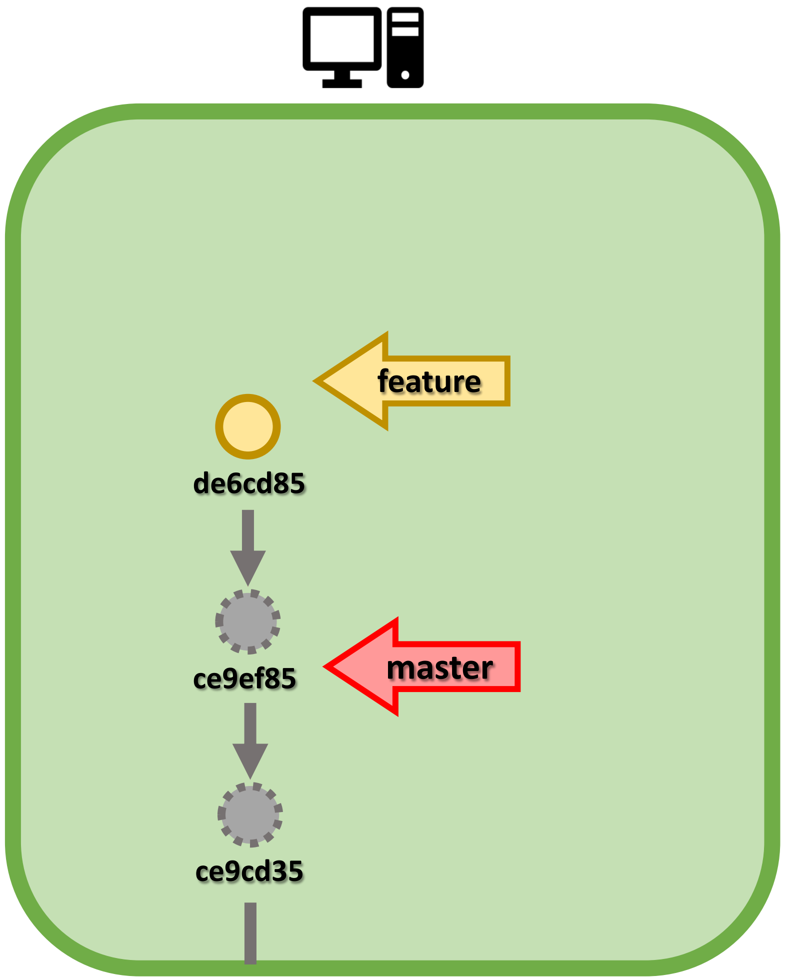
Branches & Merge



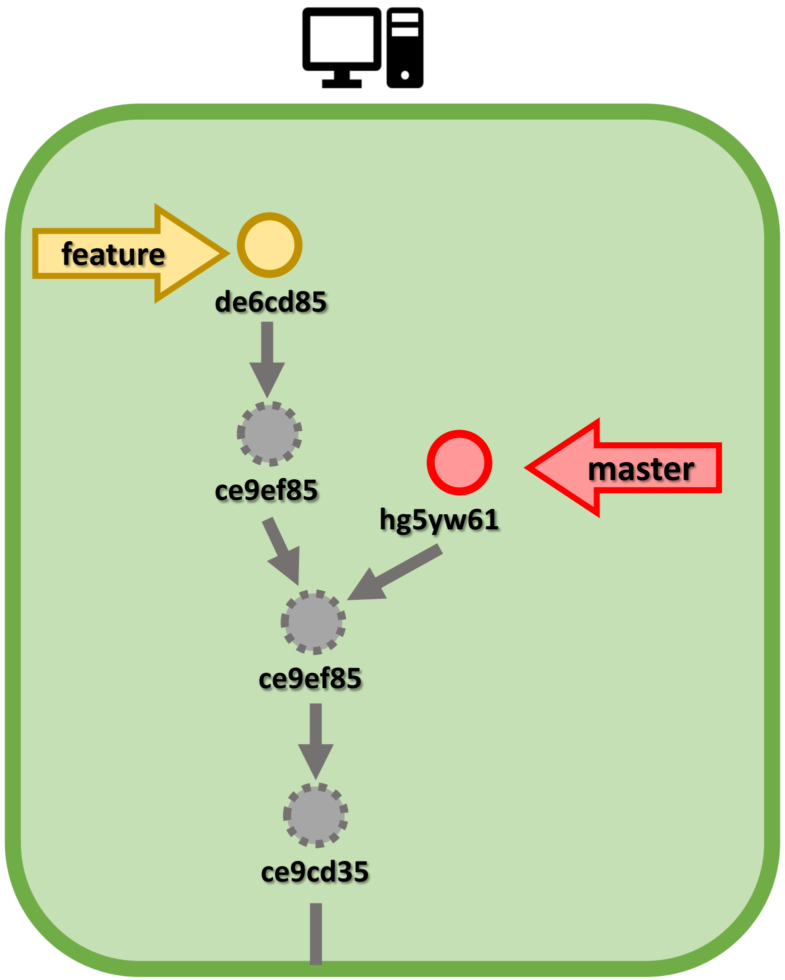
- Create a new branch called *feature*
  - master and feature will point to the same commit
- Switch to the branch *feature*
- Make a new commit
- Add changes from *feature* to *master* → Merge
- Direct path between branches
  - Fast-forward merge
- *feature* can be safely deleted

More about merge

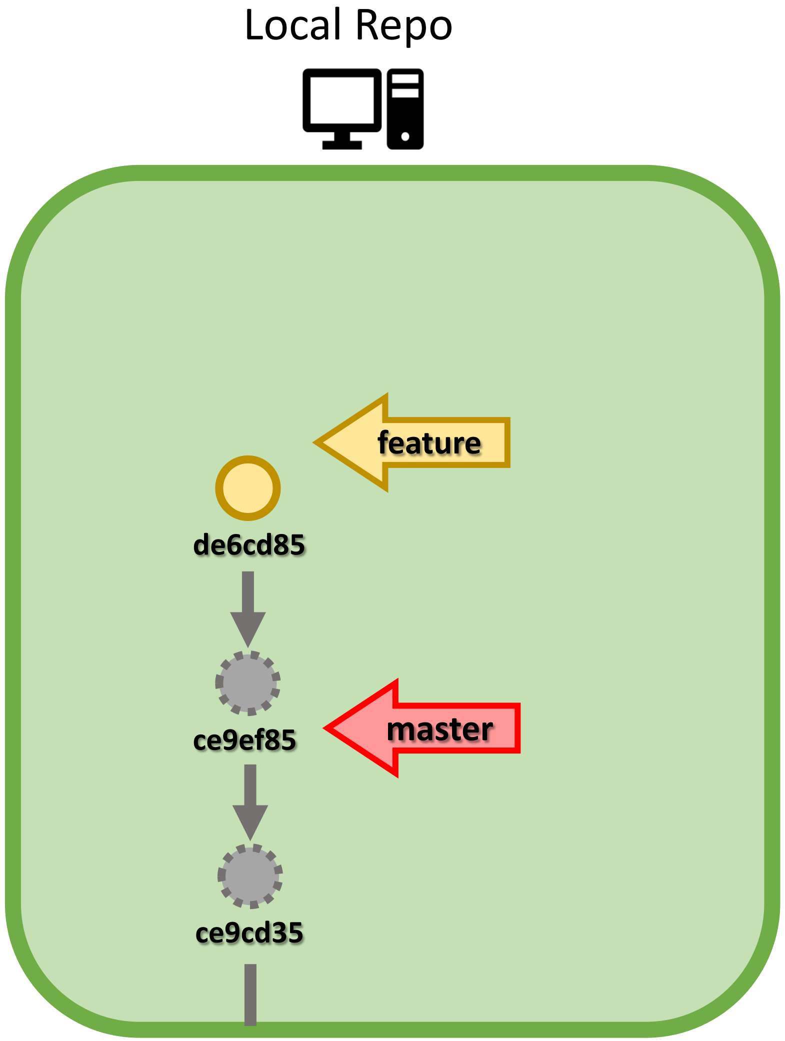
Local Repo

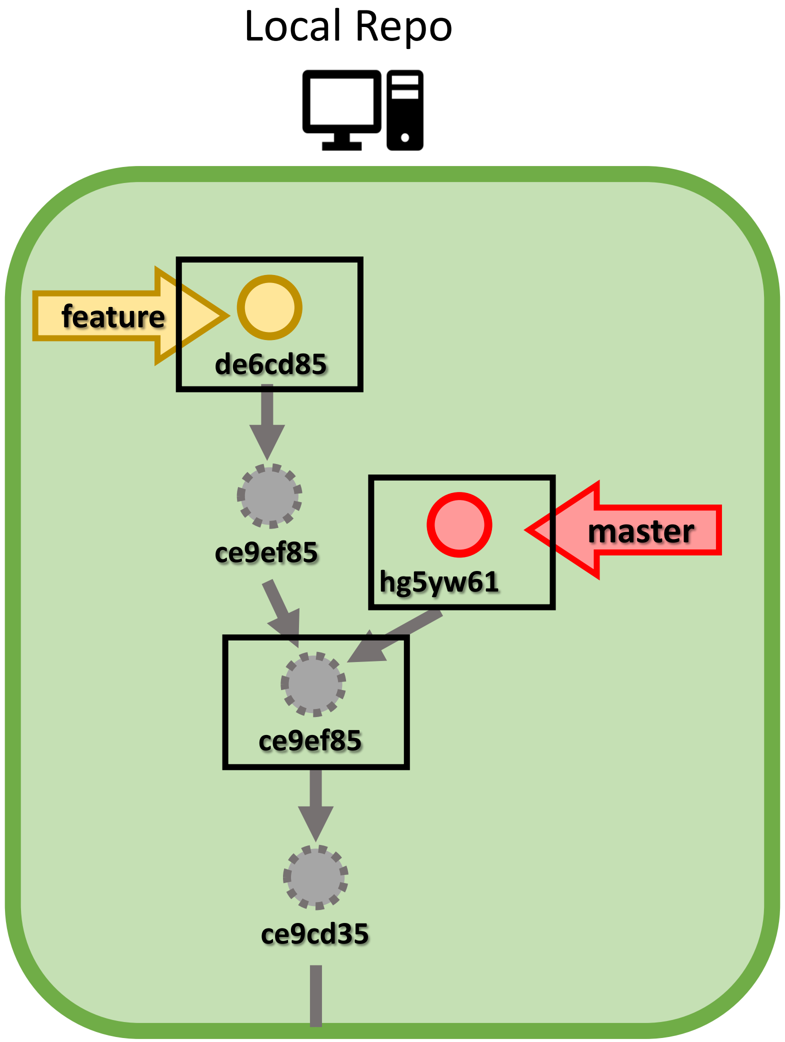


Local Repo

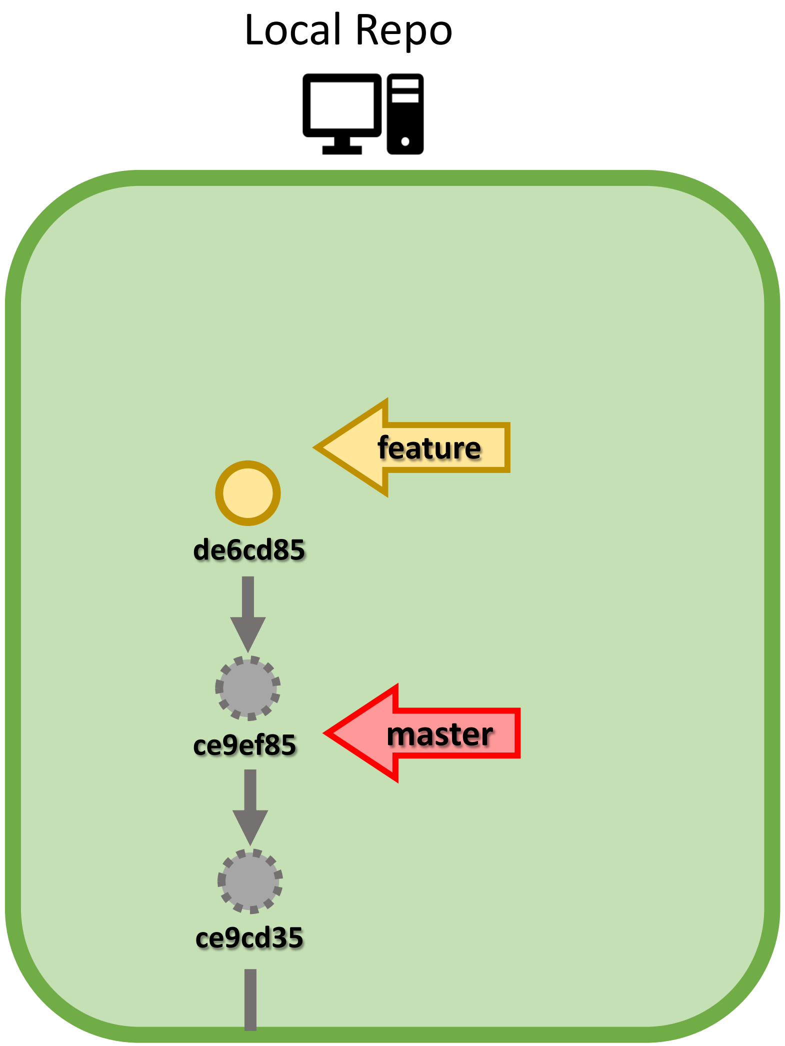


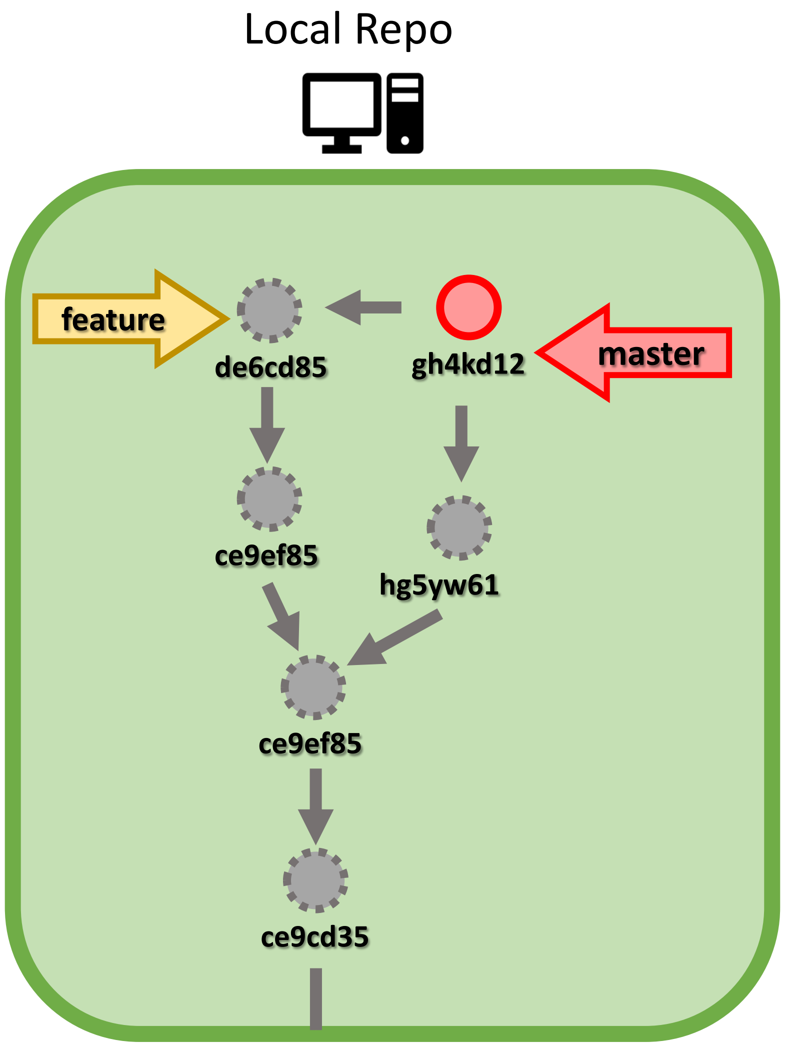
More about merge



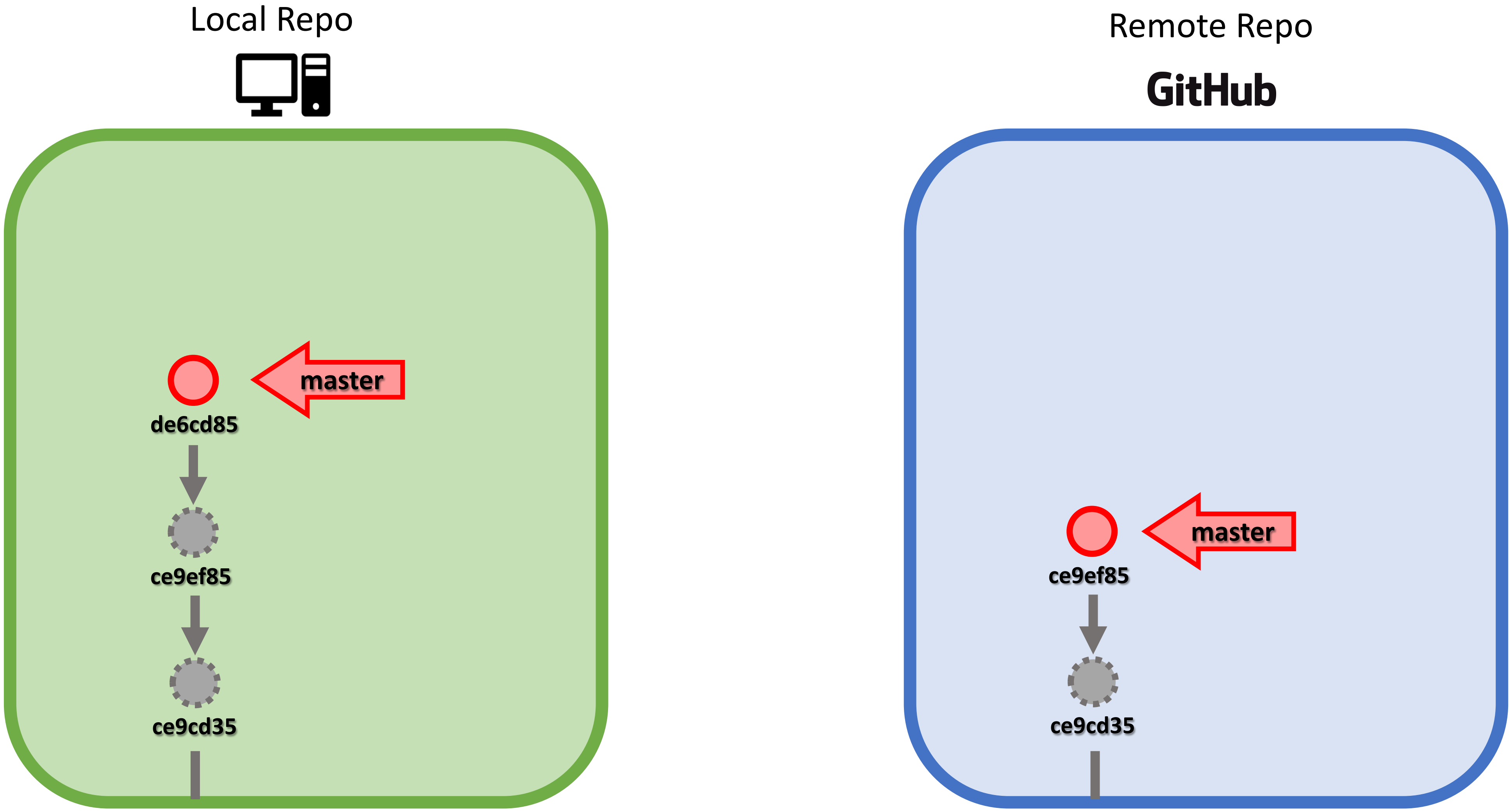


More about merge

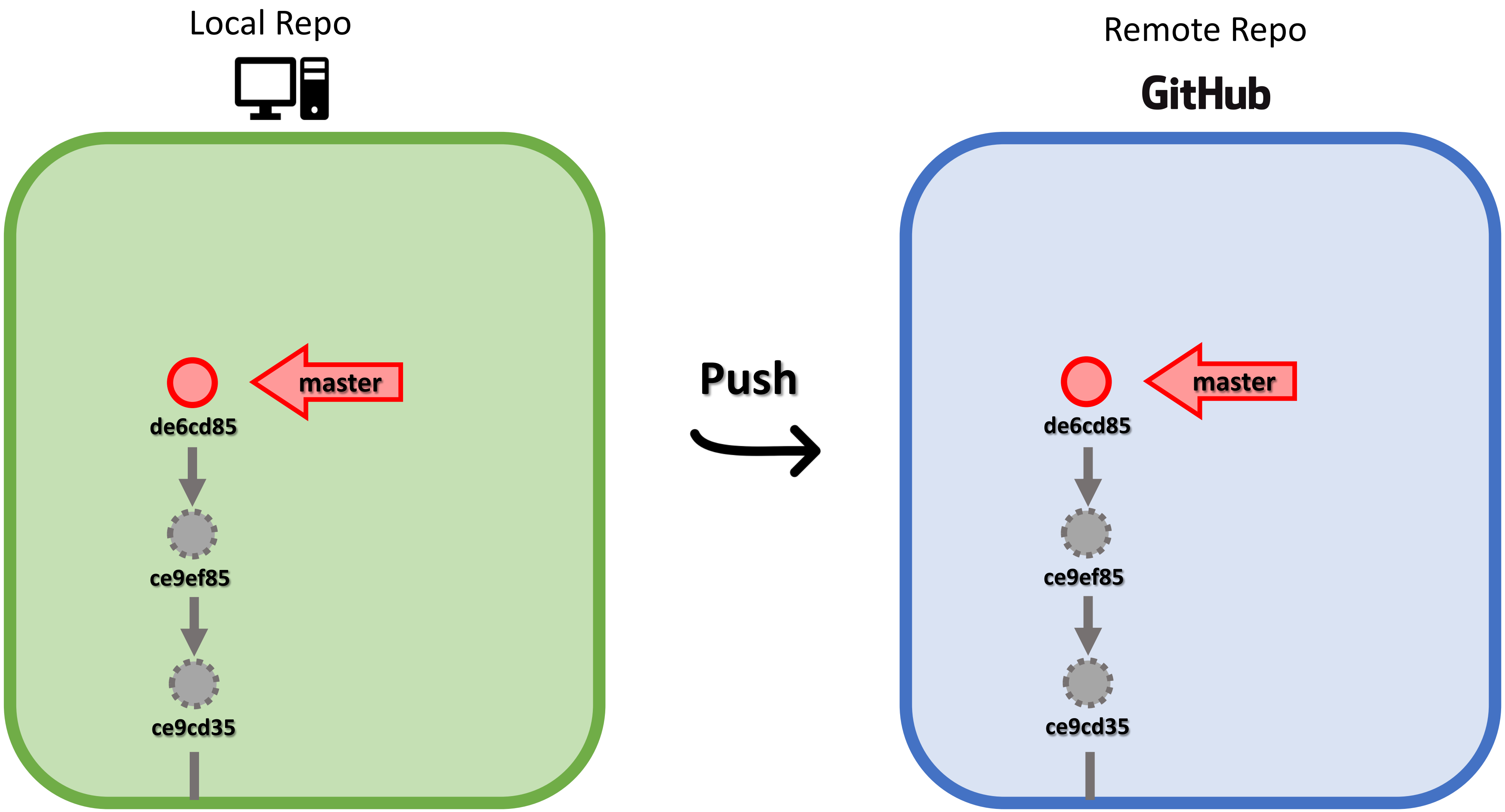




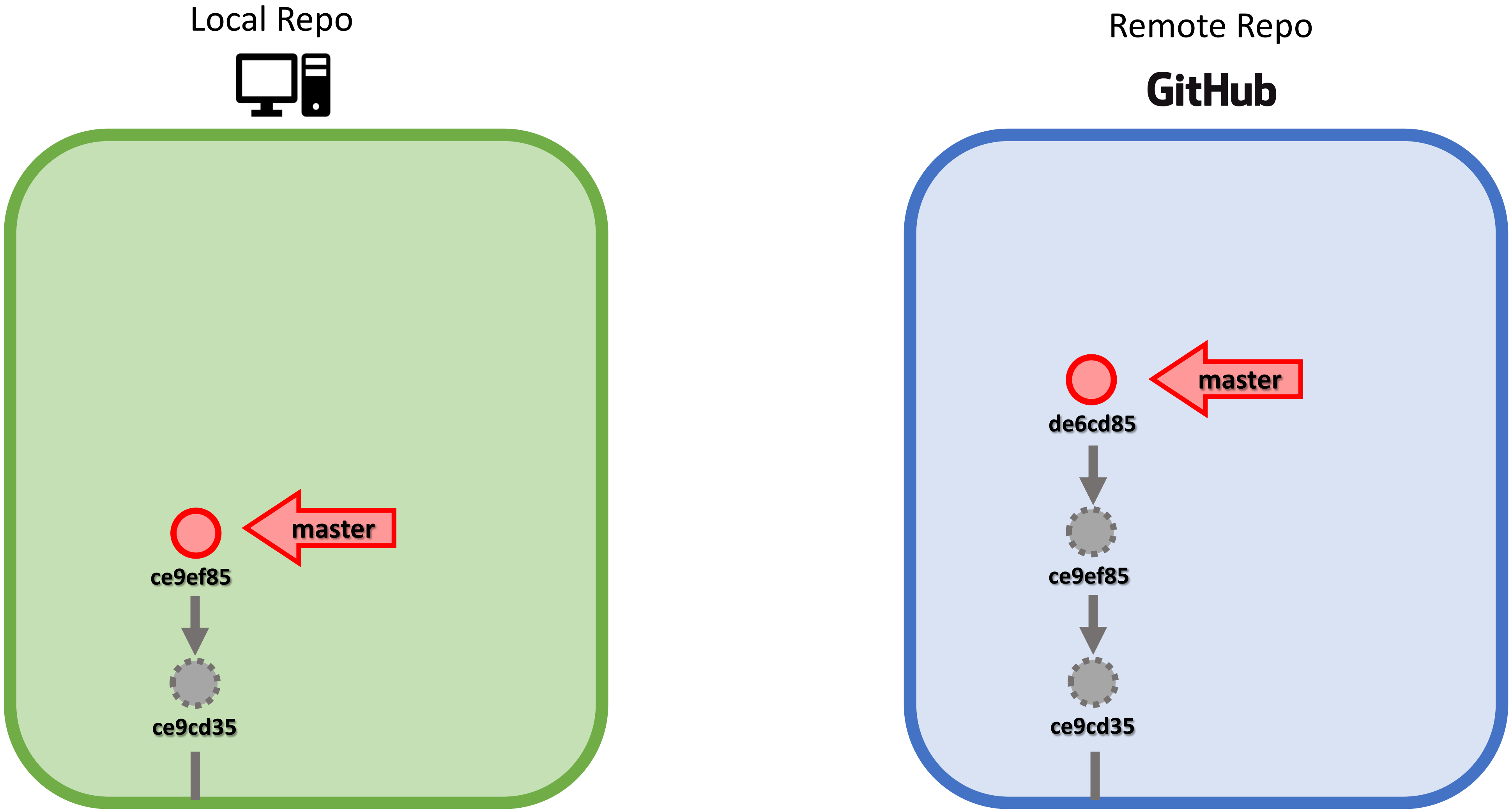
Local Repo→ Github



Local Repo→ Github



Local Repo← Github



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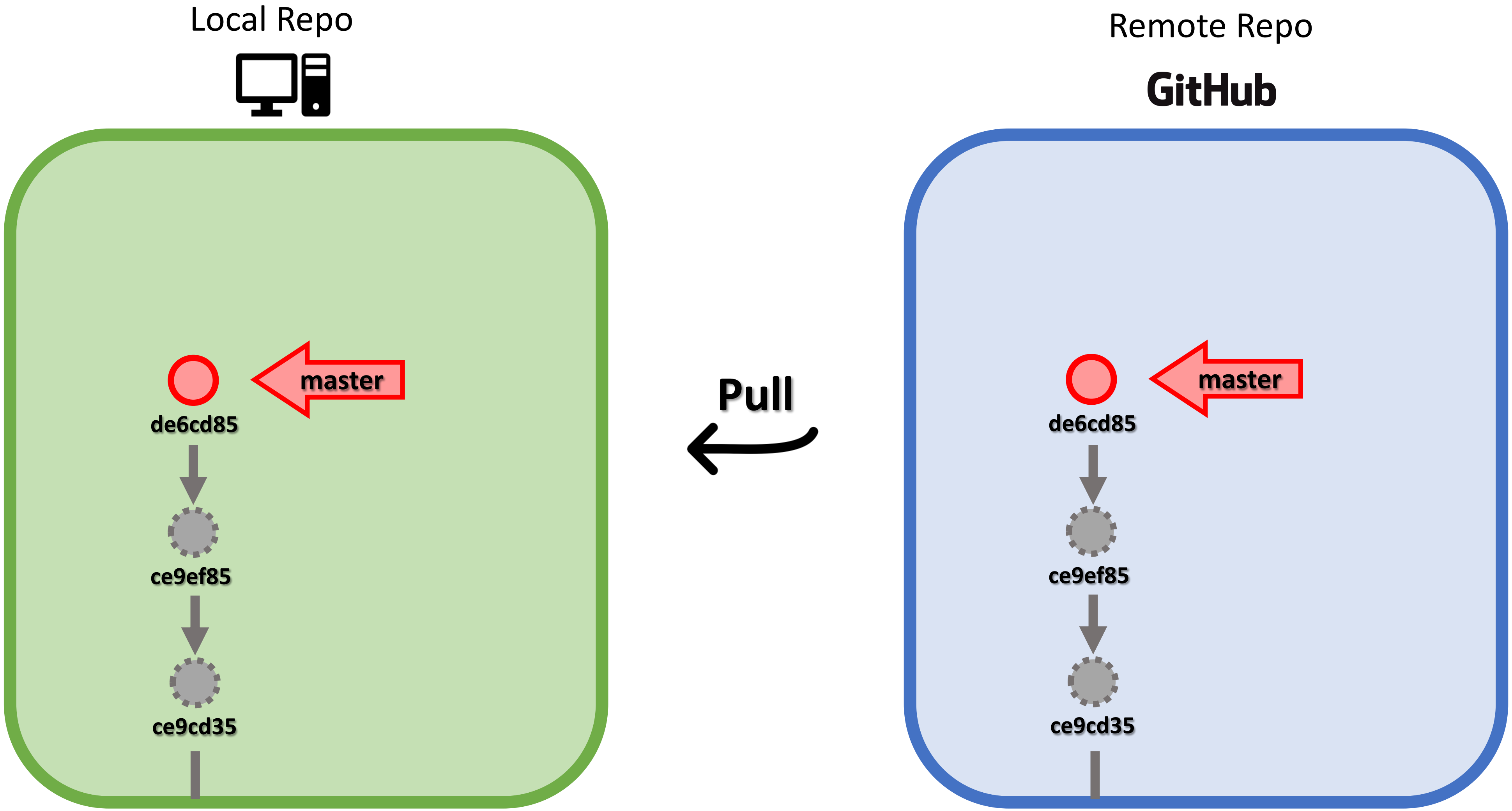
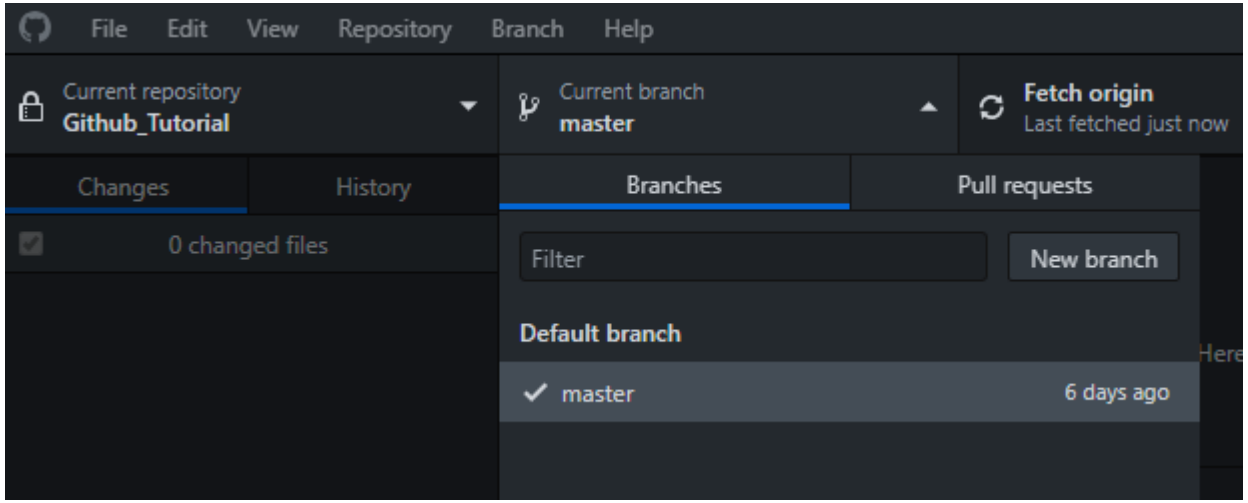
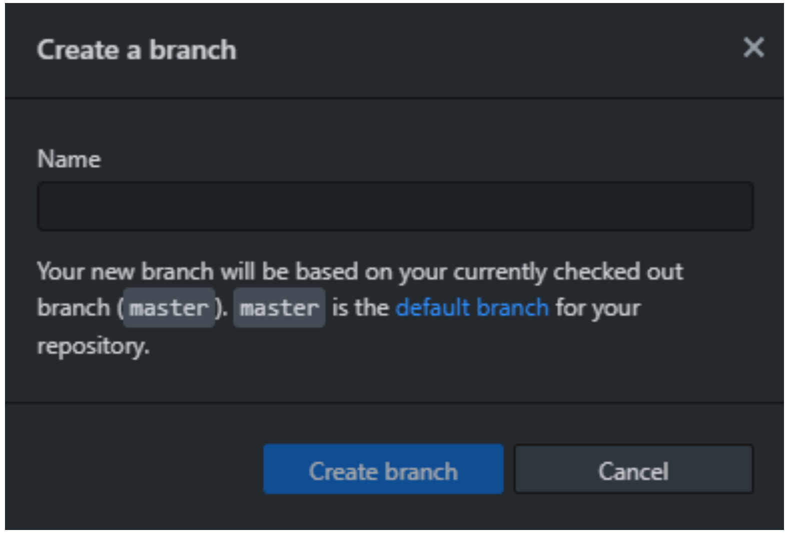


Create branches: GitDesktop

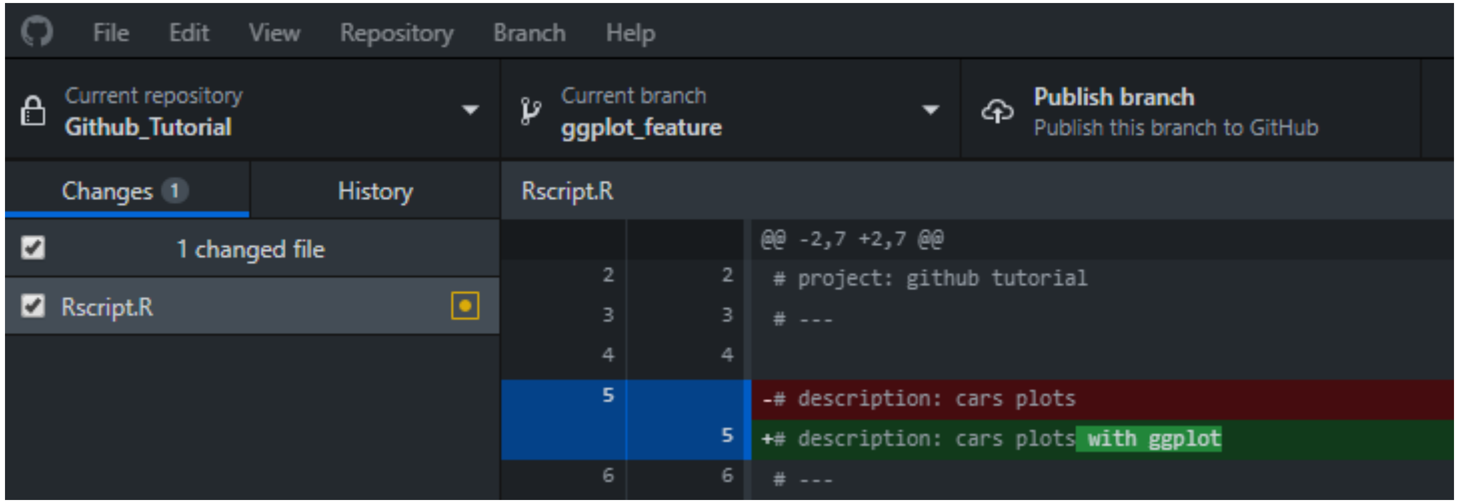




Your new branch will be based on your currently checked out branch (`master`). `master` is the default branch for your repository.

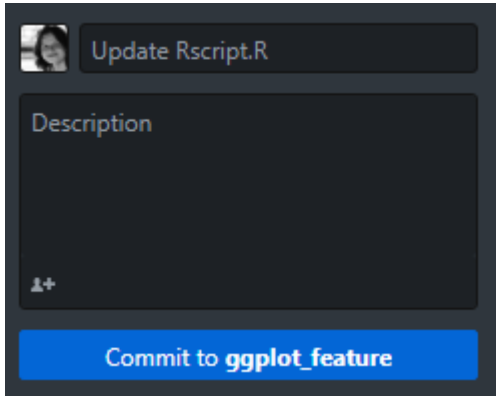
- Select the *Current branch* (as shown above)
- Click on *New branch* button
- Enter a Name in the specified field
- Click *Create branch*
- The new branch is now the current branch

Commits: GitDesktop



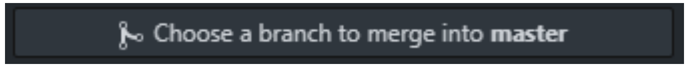
```
@@ -2,7 +2,7 @@
 # project: github tutorial
 # ---

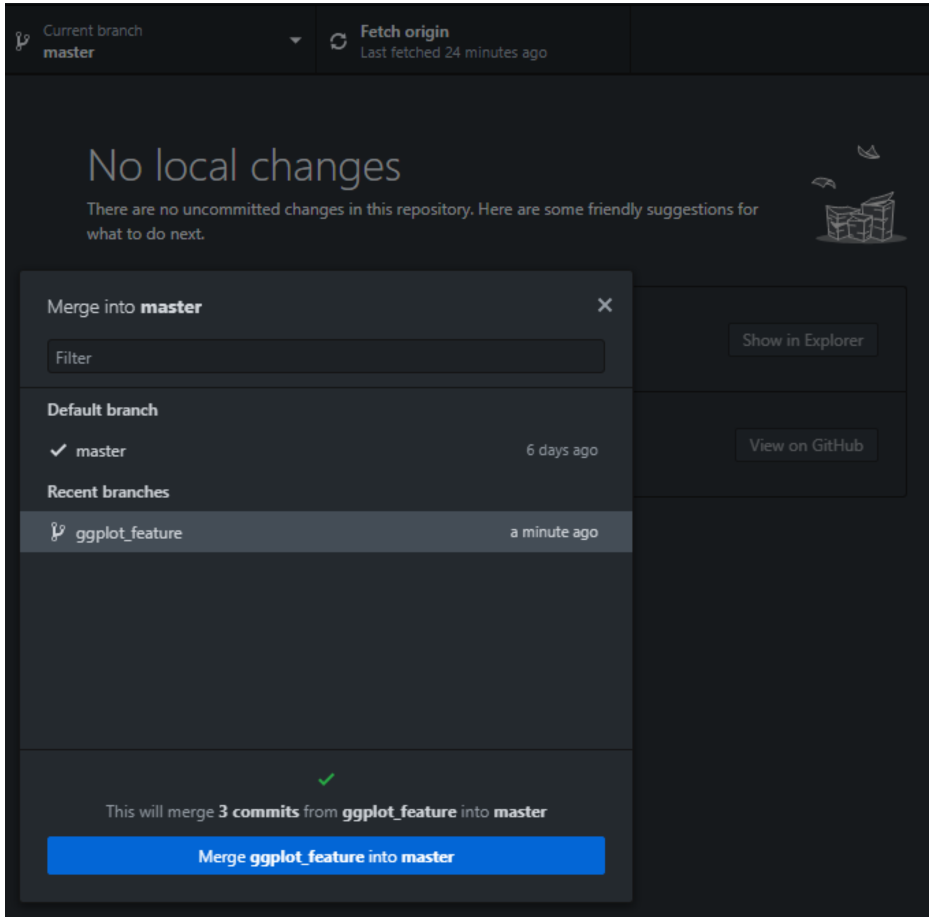
-# description: cars plots
+# description: cars plots with ggplot
 # ---
```



- Save changes made to Rscript.R
- Rscript.R appears in the *Changes* area.
- Select the file that you want to commit (Staging)
- Add a commit message
- Press *Commit to **branch*** button (ggplot_feature)

Merge & Push: GitDesktop

- Switch from *branch* to *master*
- 
  Choose a branch to merge into **master**
- Select the *branch*
- Press the *Merge* button
- Merge is done!

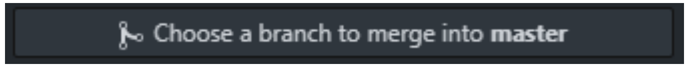


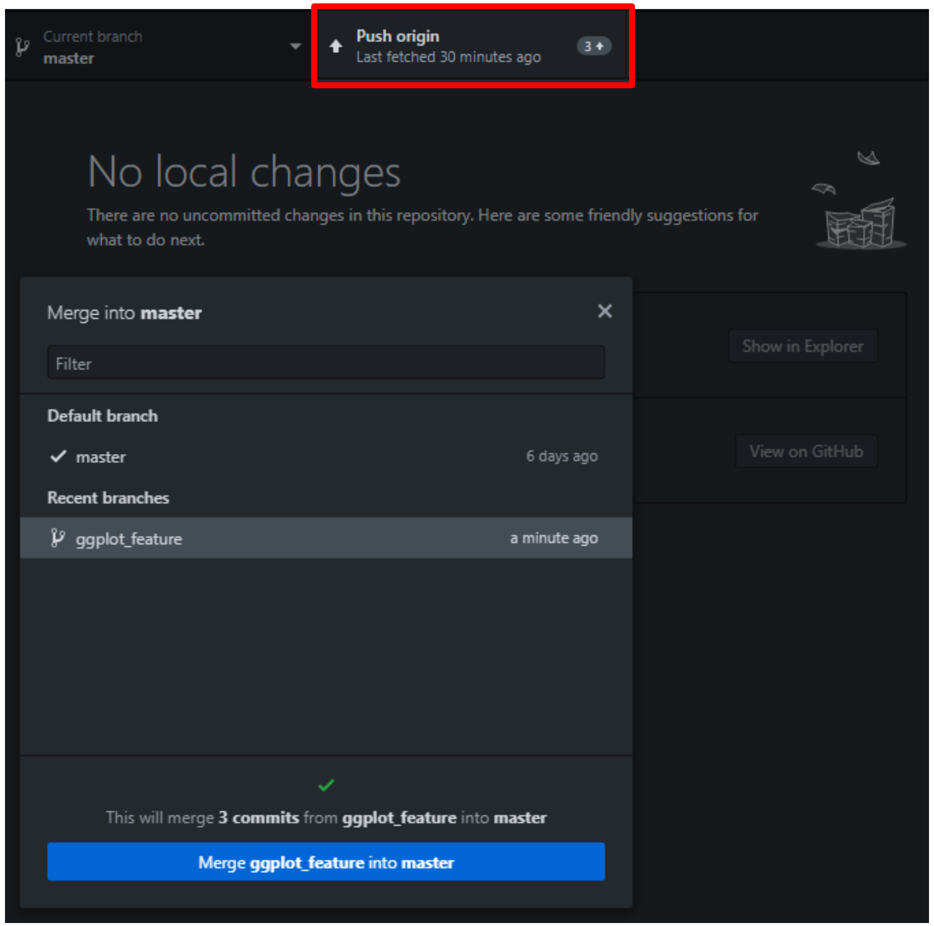
No local changes

There are no uncommitted changes in this repository. Here are some friendly suggestions for what to do next.

This will merge **3 commits** from **ggplot_feature** into **master**

Merge & Push: GitDesktop

- Switch from *branch* to *master*
- 
  Choose a branch to merge into **master**
- Select the *branch*
- Press the *Merge* button
- Merge is done!
- Push origin becomes available
- Updates local →remote
- Got to GitHub to see your changes



No local changes

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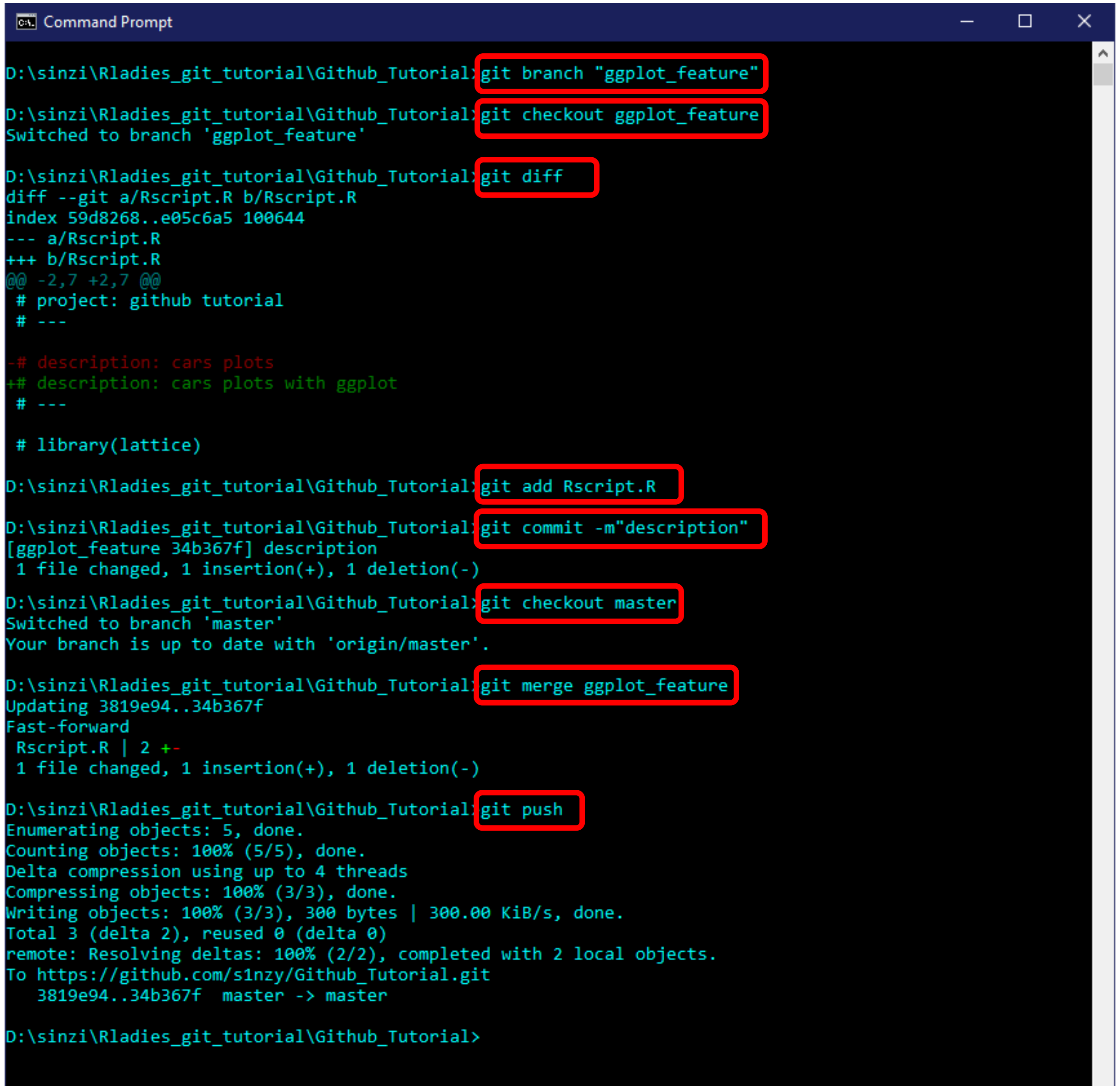
Using the command line



```
D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git branch "ggplot_feature"

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git checkout ggplot_feature
Switched to branch 'ggplot_feature'

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git diff
diff --git a/Rscript.R b/Rscript.R
index 59d8268..e05c6a5 100644
--- a/Rscript.R
+++ b/Rscript.R
@@ -2,7 +2,7 @@
 # project: github tutorial
 # ---

-# description: cars plots
+# description: cars plots with ggplot
 # ---

 # library(lattice)

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git add Rscript.R

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git commit -m"description"
[ggplot_feature 34b367f] description
 1 file changed, 1 insertion(+), 1 deletion(-)

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git checkout master
Switched to branch 'master'
Your branch is up to date with 'origin/master'.

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git merge ggplot_feature
Updating 3819e94..34b367f
Fast-forward
 Rscript.R | 2 +-
 1 file changed, 1 insertion(+), 1 deletion(-)

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>git push
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 300 bytes | 300.00 KiB/s, done.
Total 3 (delta 2), reused 0 (delta 0)
remote: Resolving deltas: 100% (2/2), completed with 2 local objects.
To https://github.com/s1nzy/Github_Tutorial.git
   3819e94..34b367f  master -> master

D:\sinzi\Rladies_git_tutorial\Github_Tutorial>
```

`git branch “branch_name”`

creates a new branch

`git checkout branch_name`

switch to that branch

`git diff`

shows unstaged changes

`git add`

adds files to the staging area (select in GitDesktop)

`git commit –m ”message”`

makes the commit

`git checkout master`

switches back to master branch

`git merge branch_name`

updates master with changes from branch

`git push origin master`

updates remote repo on github

Rscript.R

Learn by doing! Hands-on part 1

During the break, find a partner for the 2nd hands-on!

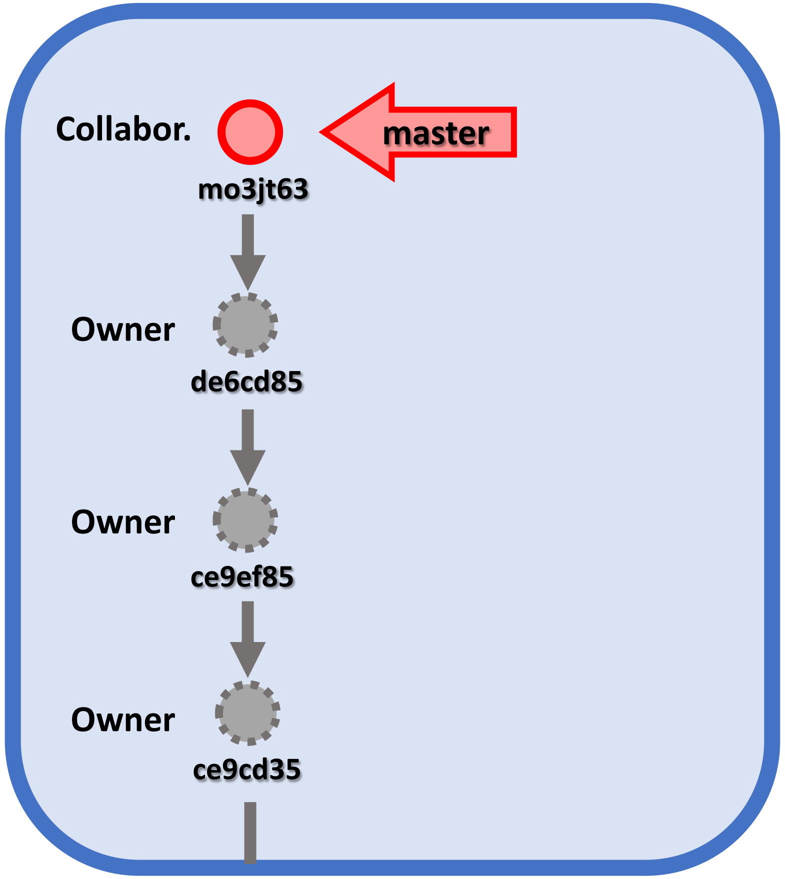
- You have downloaded a file: Rscript.R
- Basics on Github:
  - Create a new repository: GitTutorial_<initials>_<birthday> (e.g., SC_11)
  - Upload the Rscript.R to your github repo → commit
  - Edit the file with the online editor → commit
  - Check the History
- Basics on GitDesktop/CMD Prompt:
  - Clone the repository to a location of your choice
  - Create a branch (and checkout branch)
  - Click on *Show in Explorer* button (go to your local repo) and open the Rscript.R
  - Change: the color of the dots → commit
  - Change: remove the grid from the plot → commit
  - Merge these changes to your master
  - Push changes to remote repository
- While doing this pay attention to the local history and check if your changes were pushed correctly to github

Working with others on the same repo: contributor vs. collaborator

- Collaborator:
  - You can add someone to be a collaborator for your project
  - You give them rights to make changes to that repo as if they would own it
  - Repo in github → settings → collaborator → look up the username → add
  - The same working standard applies, make a working branch and do not change things directly on the master

Remote Repo

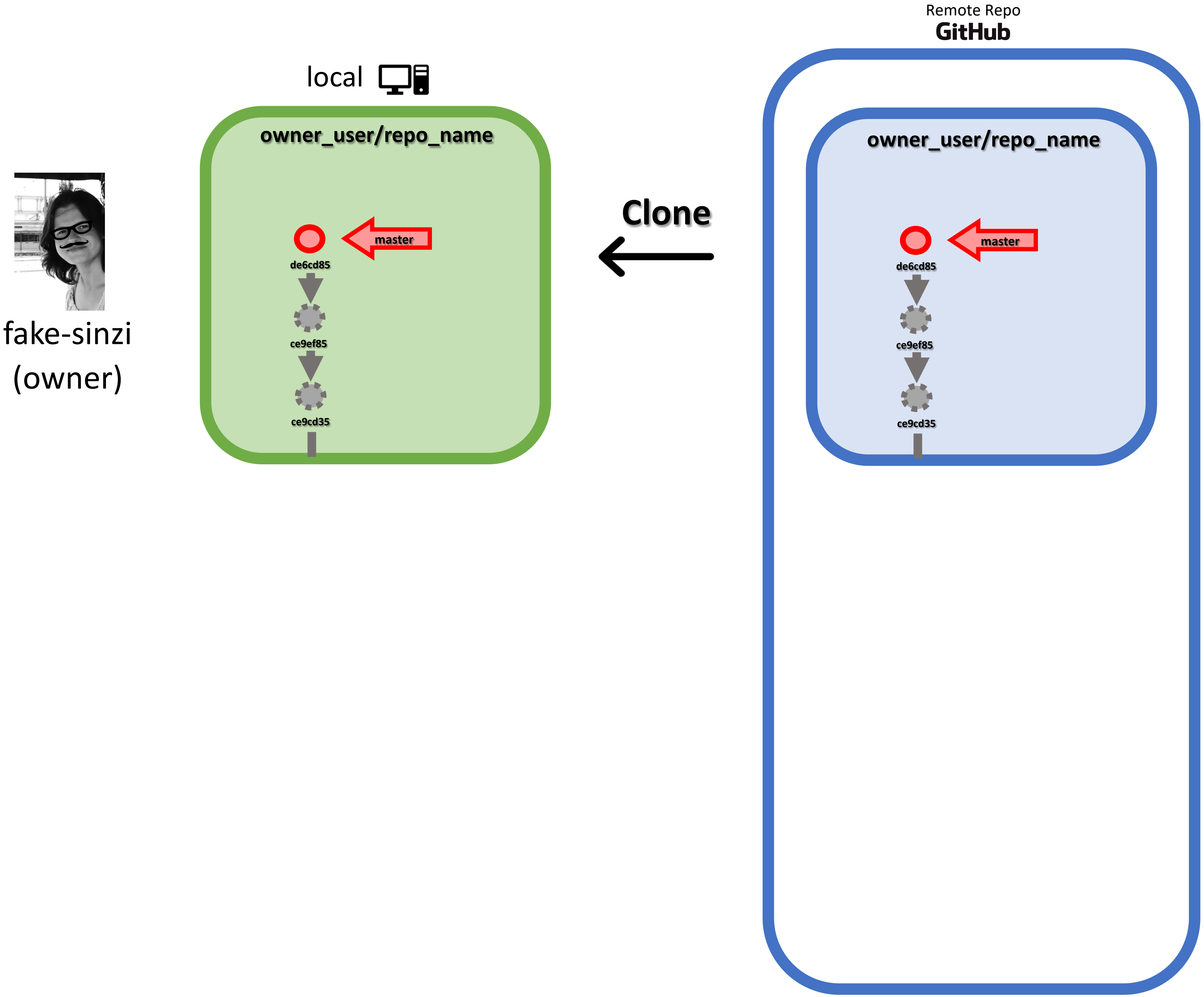
GitHub



Working with others on the same repo: contributor vs. collaborator

- Contributor:
  - Someone who wants to use/contribute your repository
  - They ask you (the owner) to revise & accept their changes before merging them to your repo

How to become a contributor?



Remote Repo

GitHub

local

fake-sinzi

(owner)

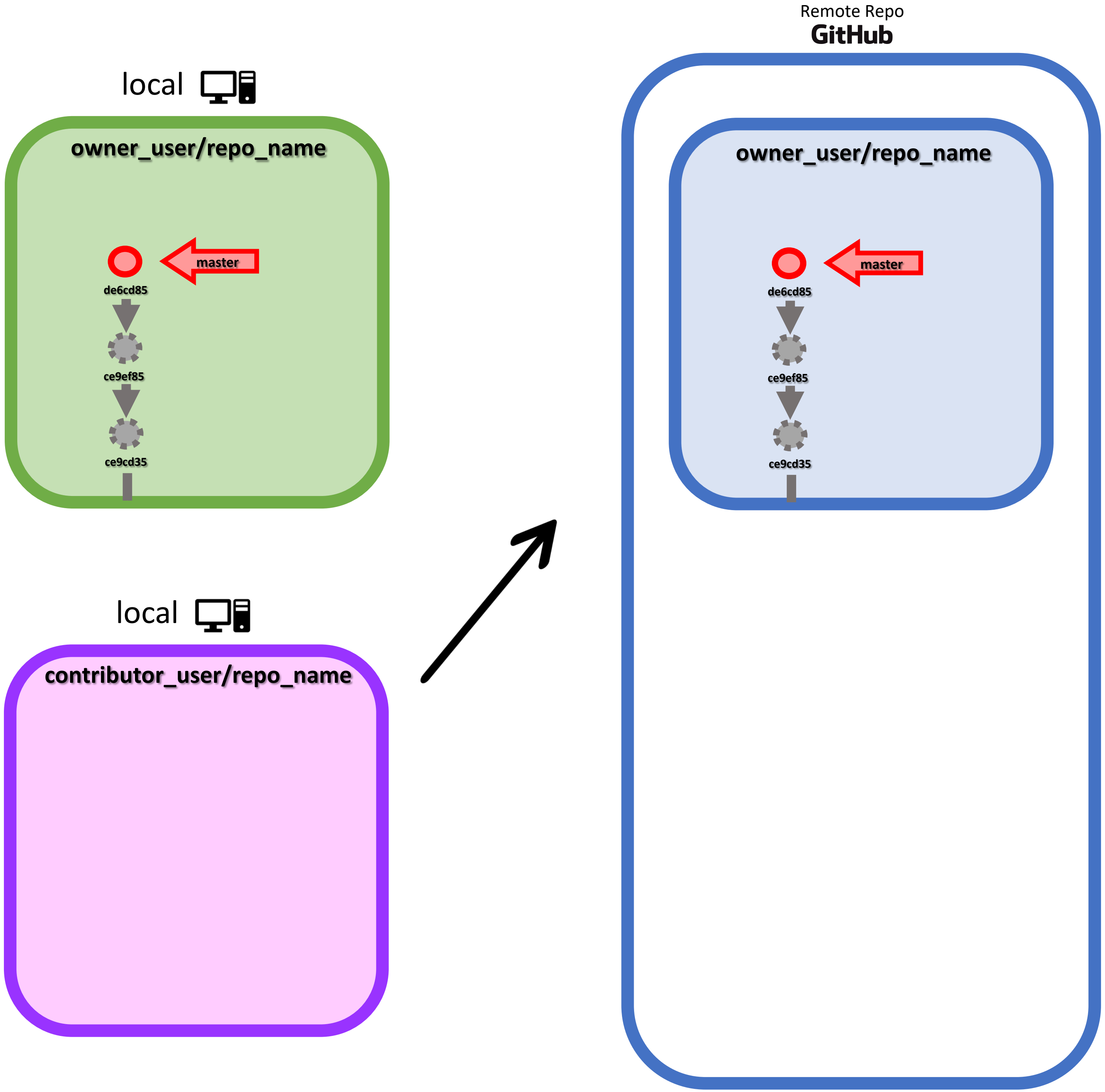
owner_user/repo_name

Clone

owner_user/repo_name

fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

local

contributor_user/repo_name

owner_user/repo_name

master

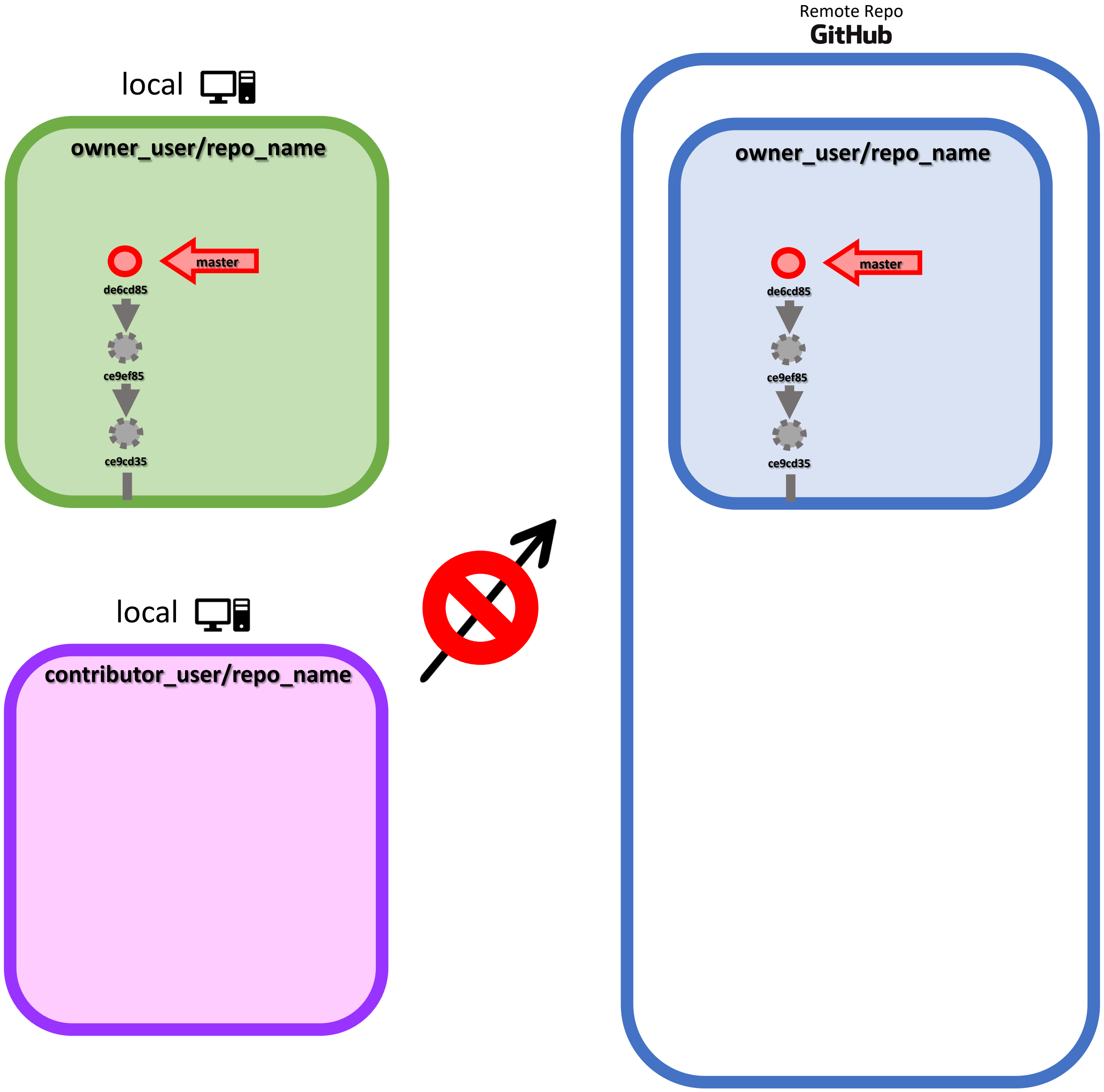
de6cd85

ce9ef85

ce9cd35

fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

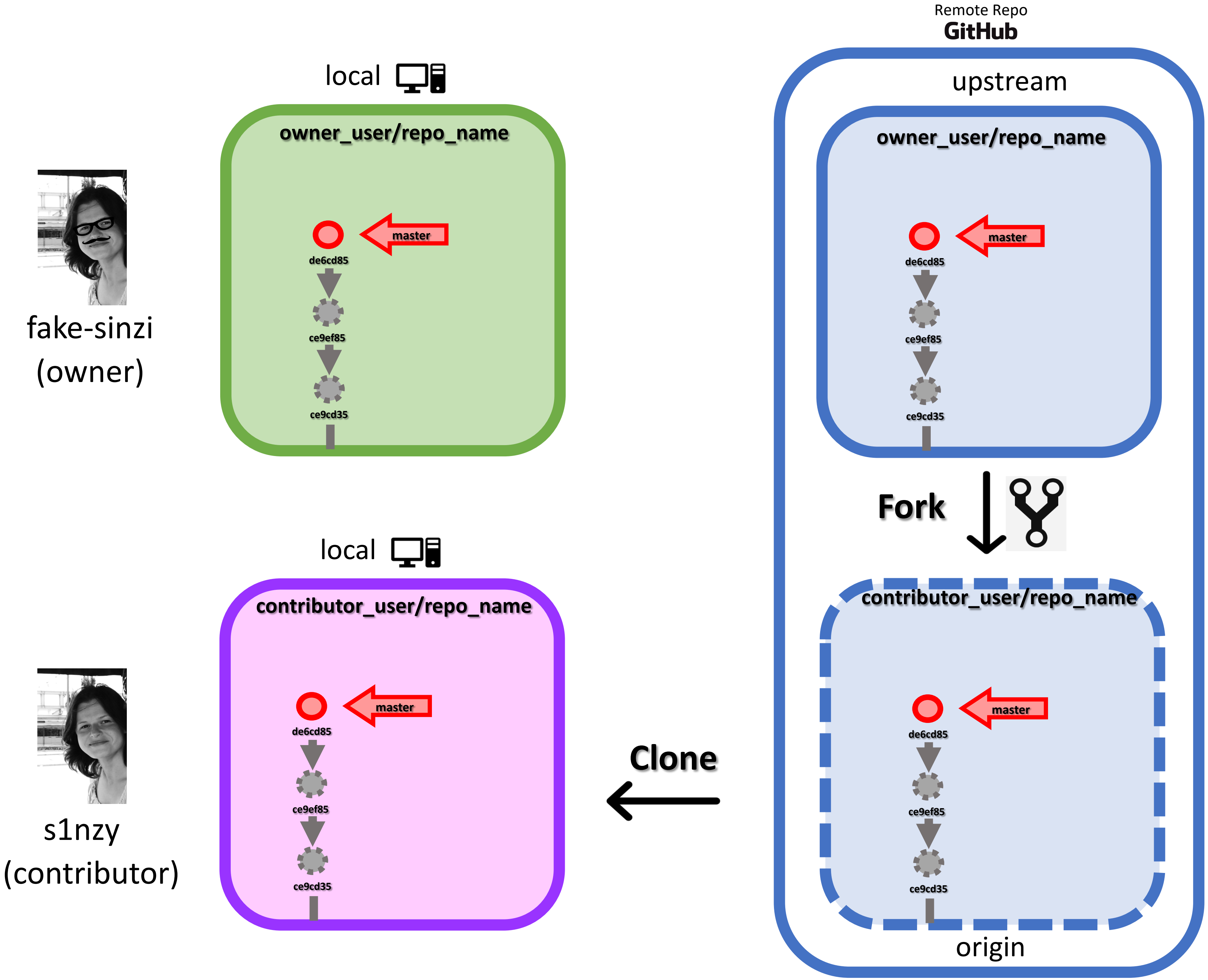
local

owner_user/repo_name

local

contributor_user/repo_name

owner_user/repo_name



Remote Repo
GitHub

upstream

owner_user/repo_name

Fork

contributor_user/repo_name

origin

local

owner_user/repo_name

fake-sinzi
(owner)

local

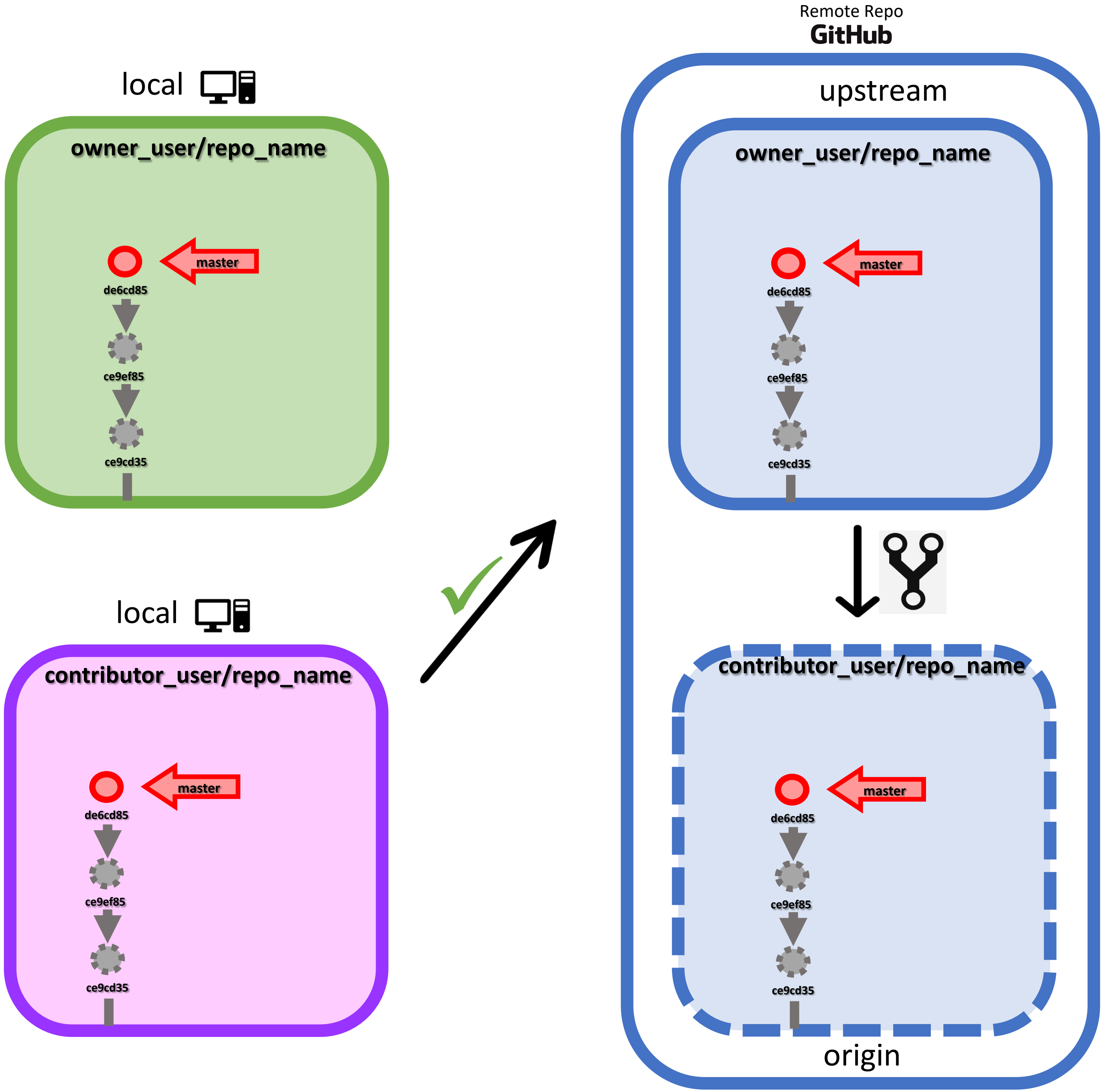
contributor_user/repo_name

s1nzy
(contributor)

Clone

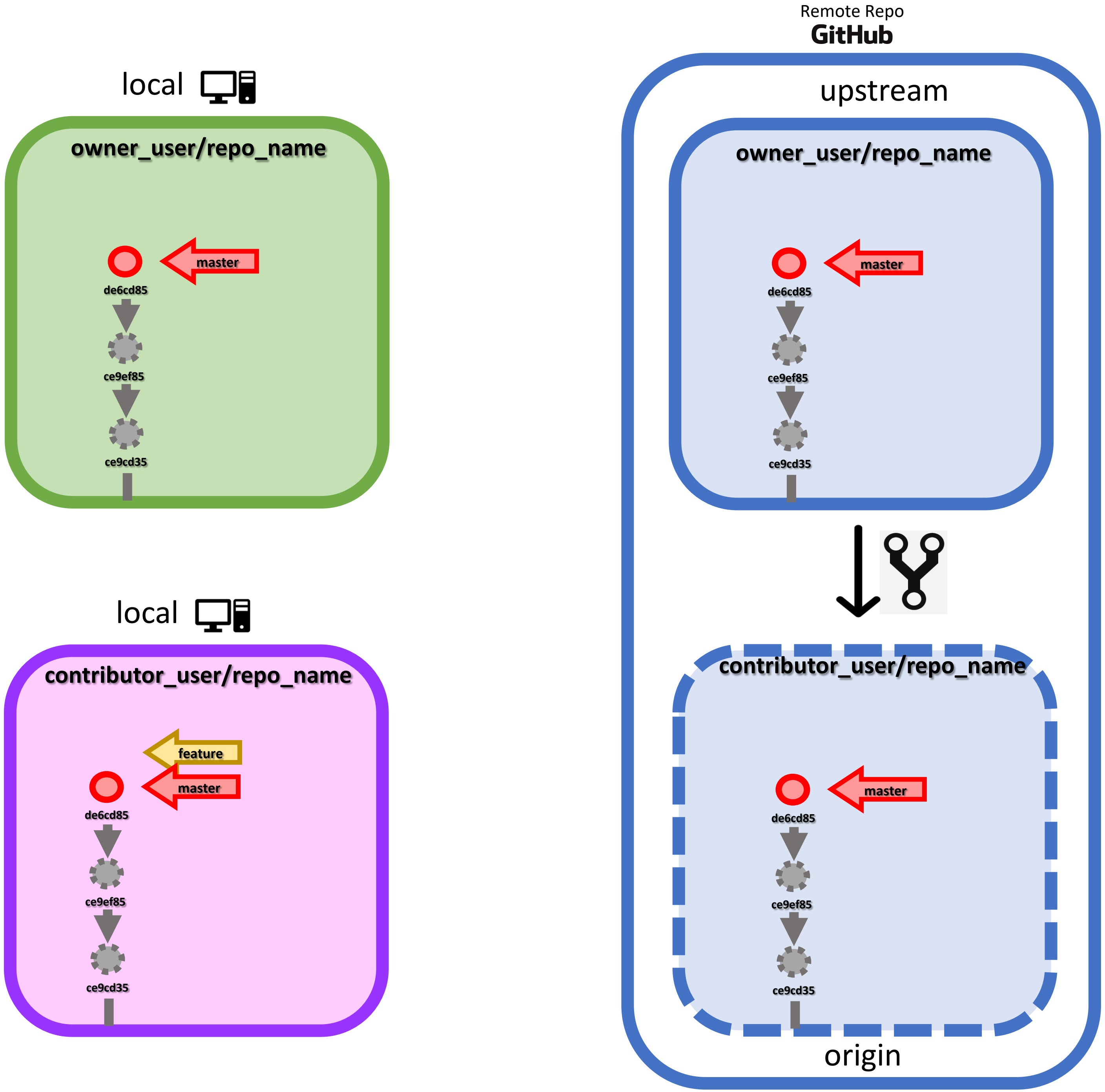
fake-sinzi
(owner)

s1nzy
(contributor)



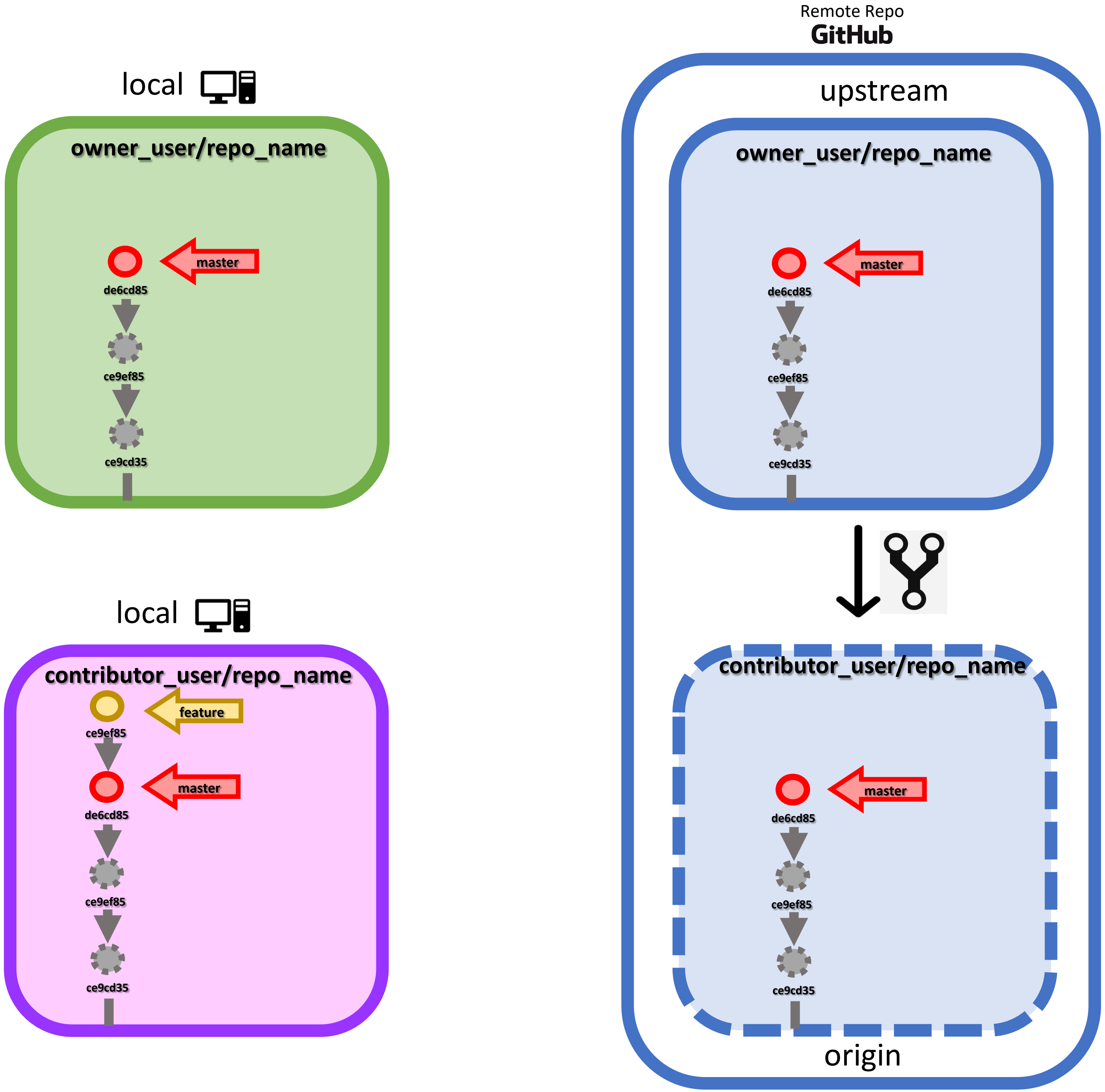
fake-sinzi
(owner)

s1nzy
(contributor)



fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

local

owner_user/repo_name

local

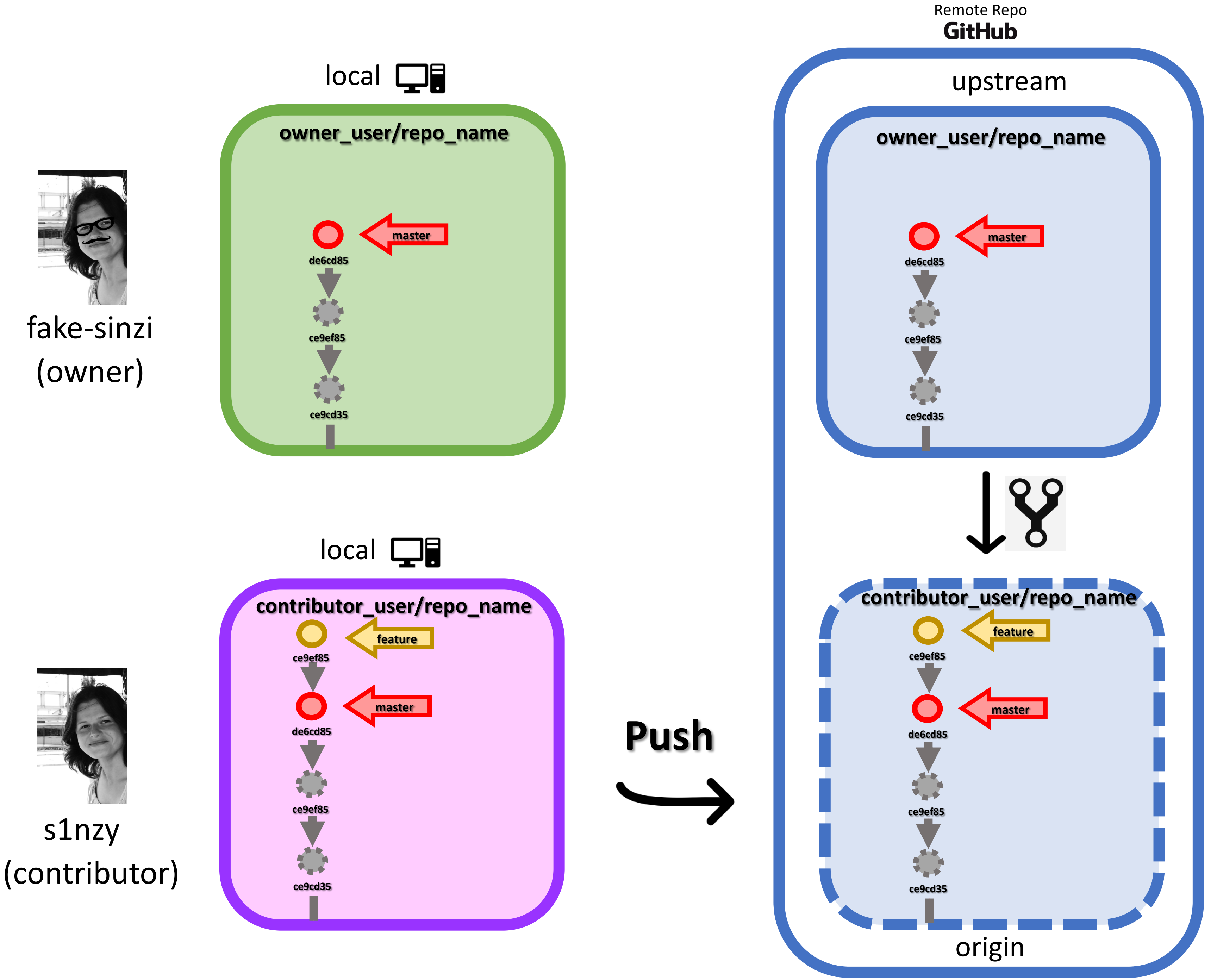
contributor_user/repo_name

upstream

owner_user/repo_name

contributor_user/repo_name

origin



Remote Repo
GitHub

fake-sinzi
(owner)

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

s1nzy
(contributor)

local

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

ce9ef85

ce9cd35

Push

upstream

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

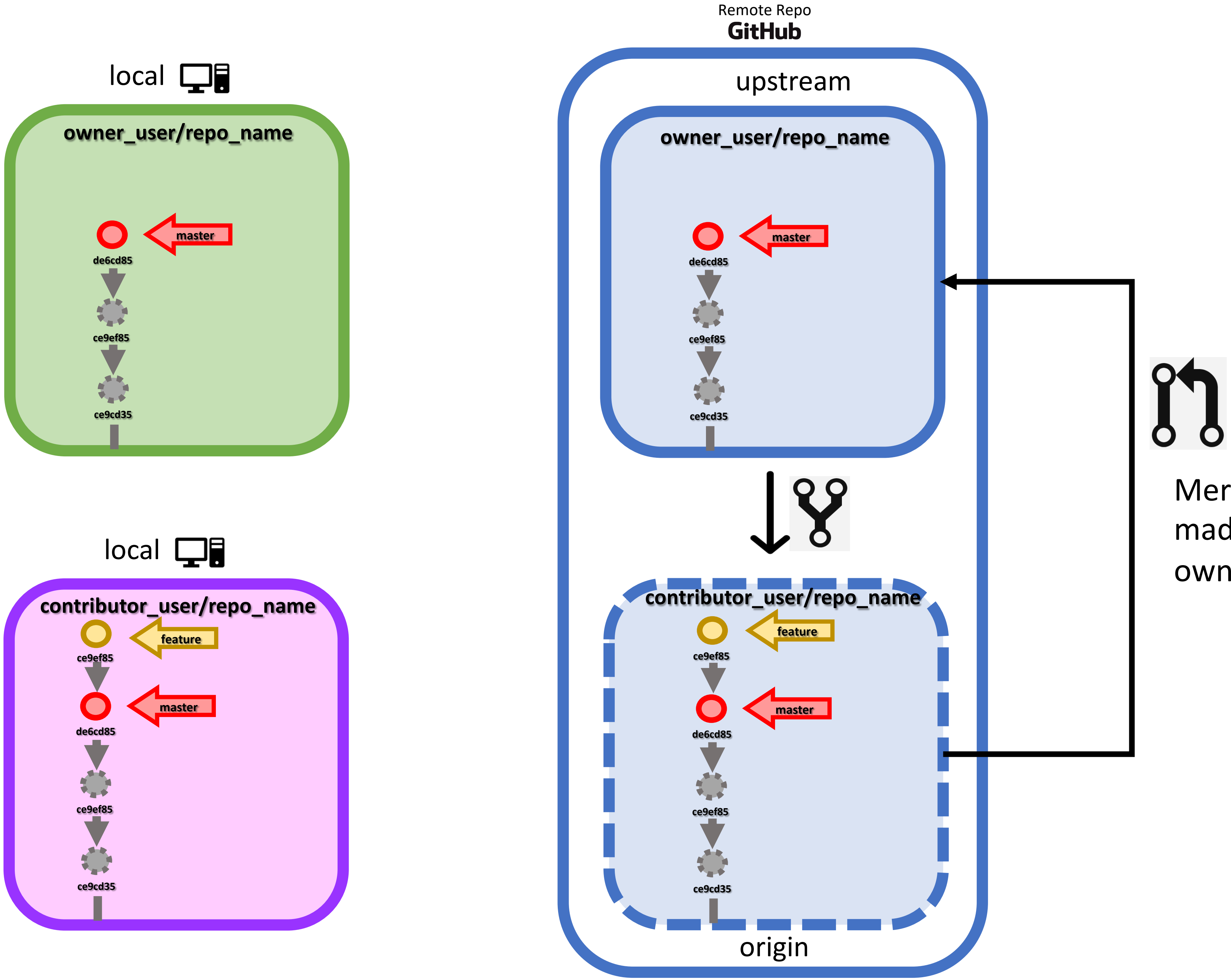
ce9ef85

ce9cd35

origin

fake-sinzi
(owner)

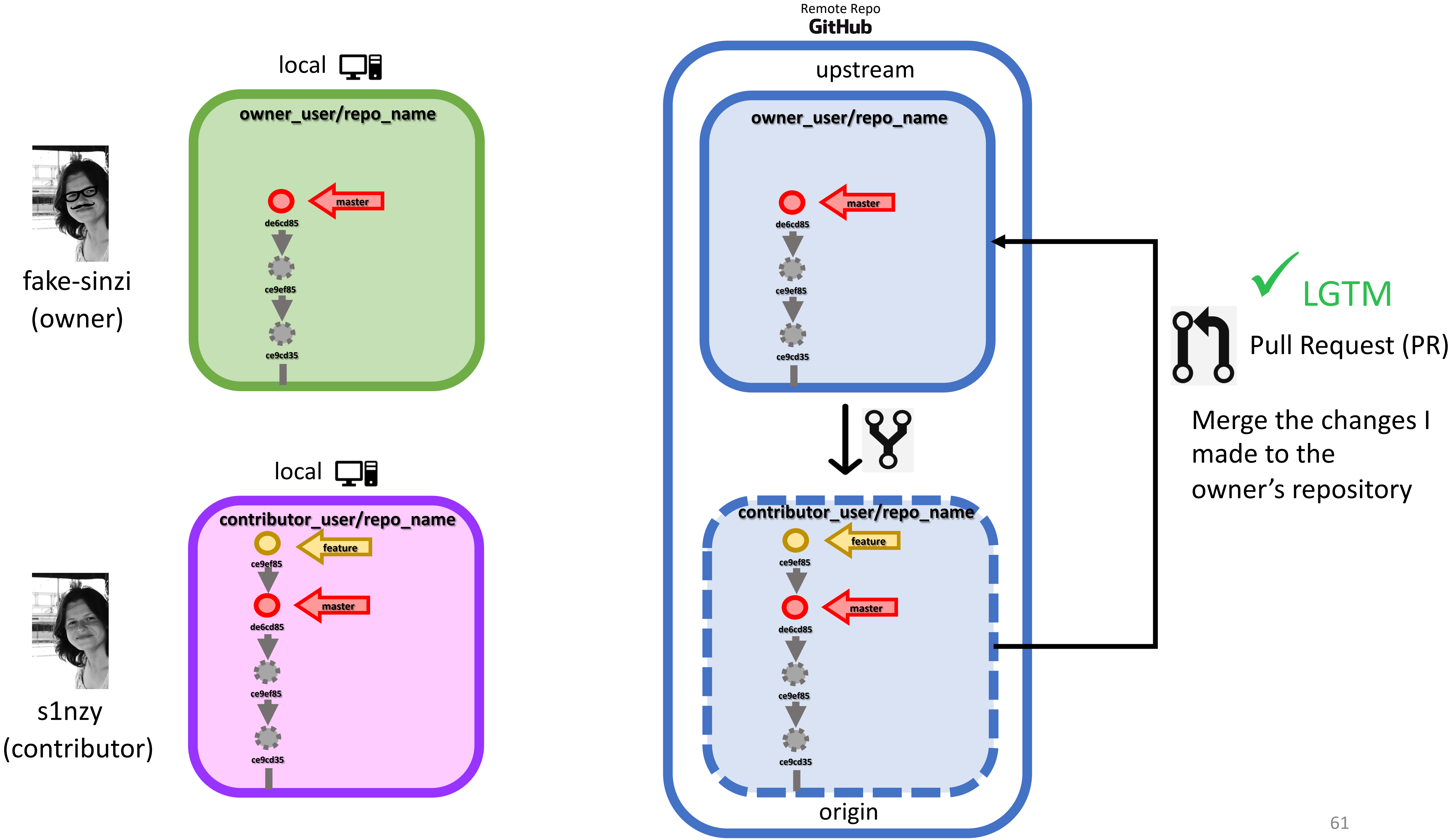
s1nzy
(contributor)



Remote Repo
GitHub

Pull Request (PR)

Merge the changes I made to the owner’s repository



Remote Repo
GitHub

upstream

origin

local

fake-sinzi
(owner)

s1nzy
(contributor)

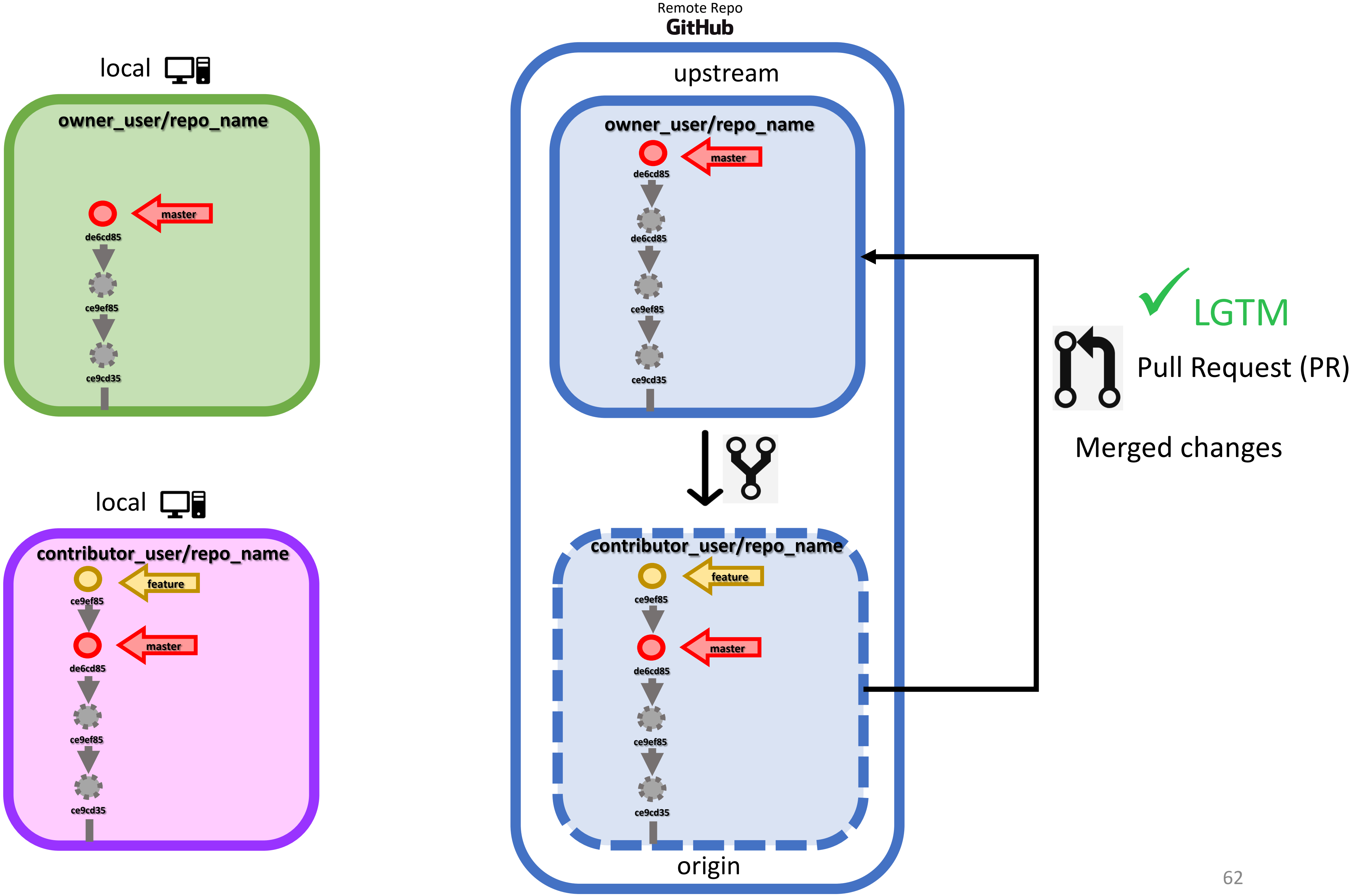
LGTM

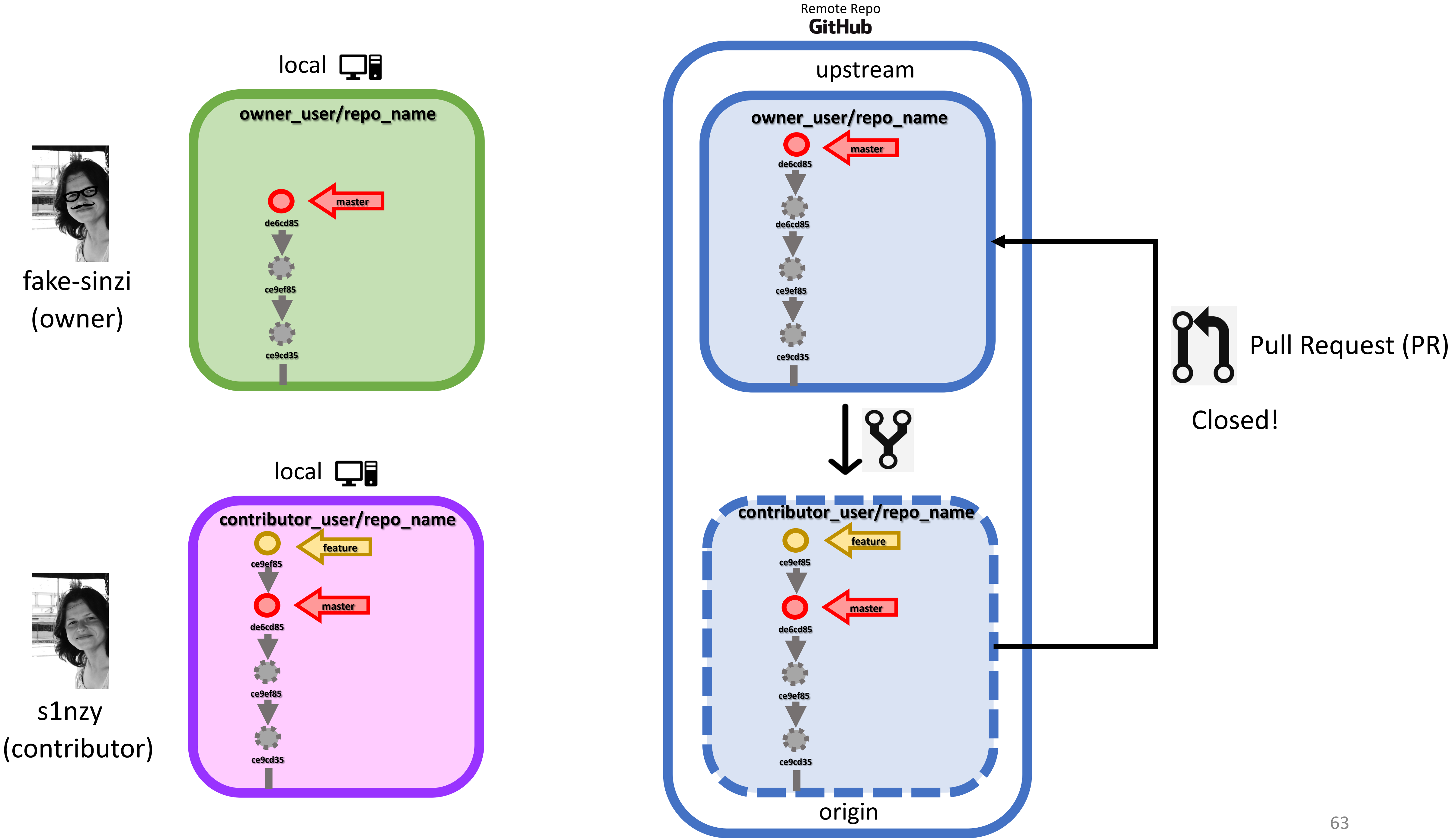
Pull Request (PR)

Merge the changes I made to the owner's repository

fake-sinzi
(owner)

s1nzy
(contributor)





Remote Repo
GitHub

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

fake-sinzi
(owner)

local

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

ce9ef85

ce9cd35

s1nzy
(contributor)

upstream

owner_user/repo_name

master

de6cd85

de6cd85

ce9ef85

ce9cd35

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

ce9ef85

ce9cd35

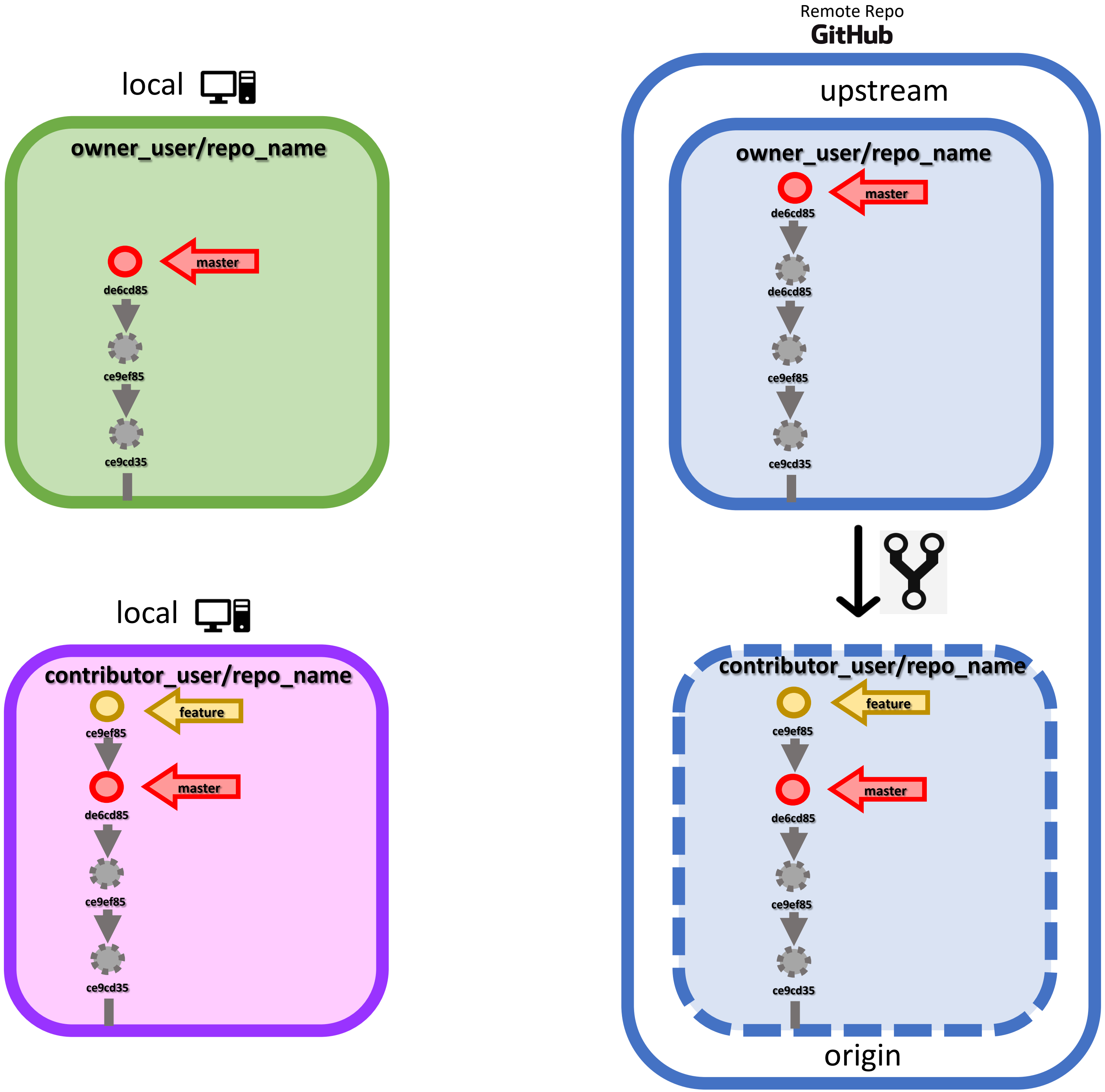
origin

Pull Request (PR)

Closed!

fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

local

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

ce9ef85

ce9cd35

upstream

owner_user/repo_name

master

de6cd85

de6cd85

ce9ef85

ce9cd35

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

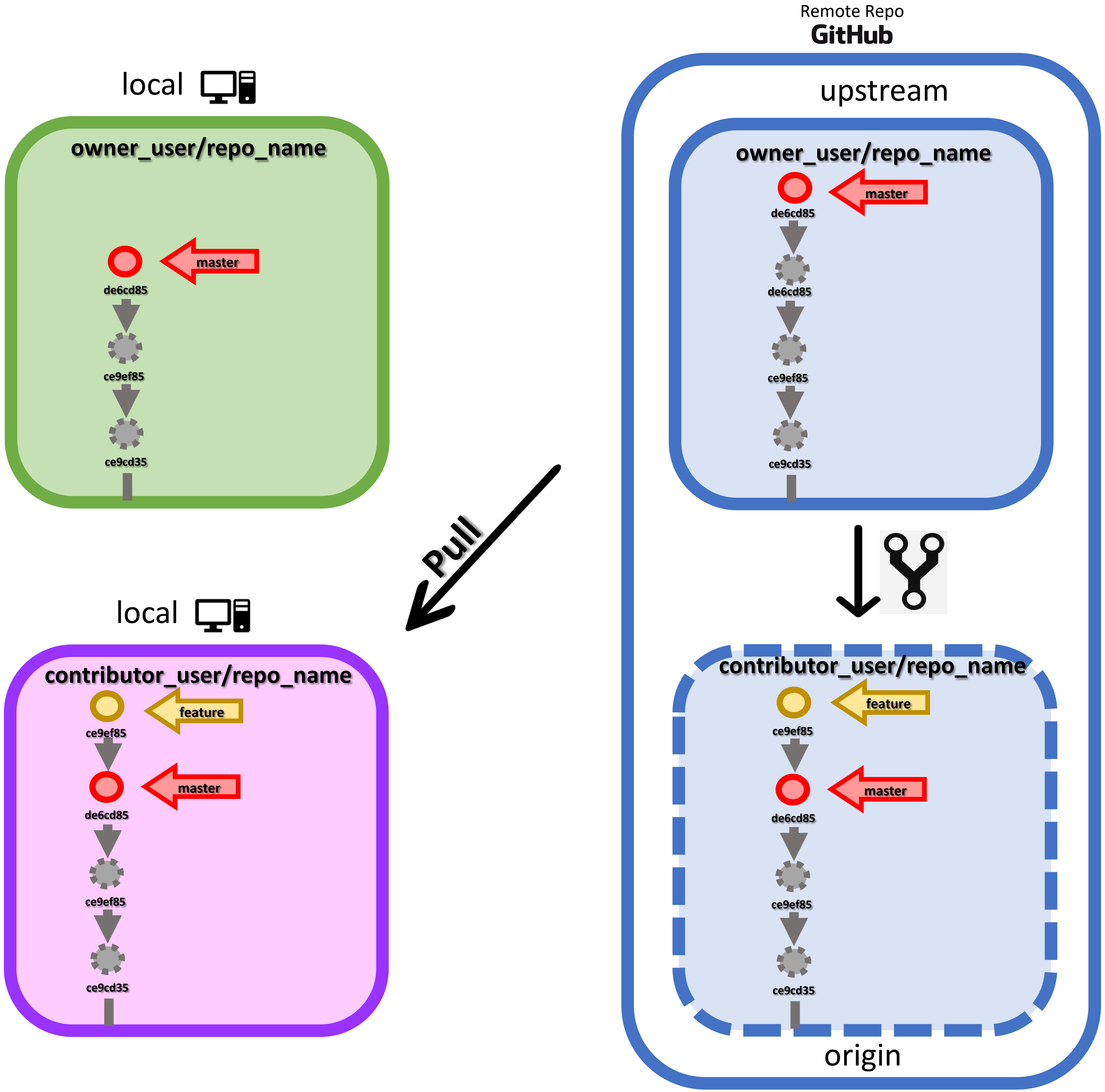
ce9ef85

ce9cd35

origin

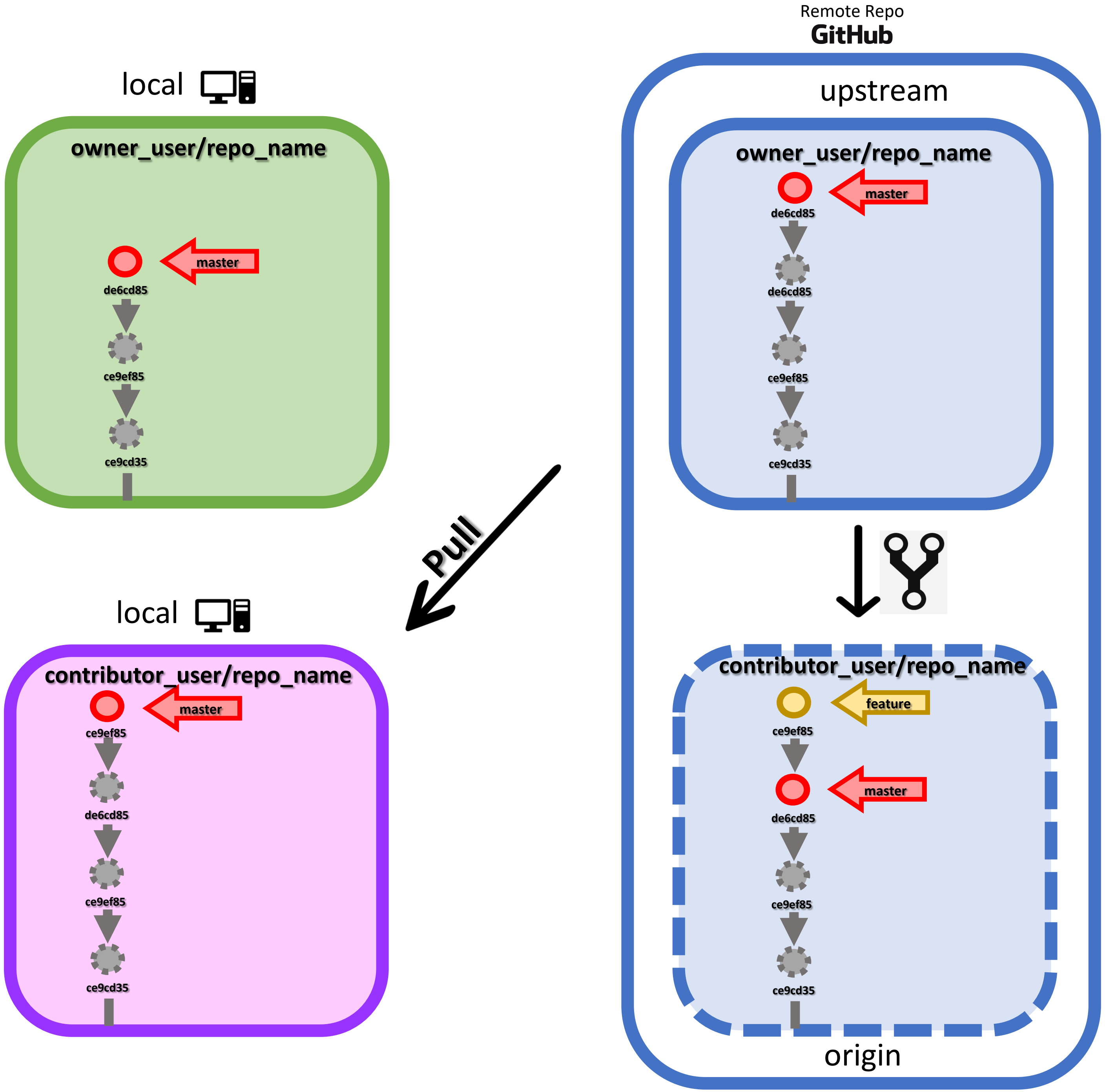
fake-sinzi
(owner)

s1nzy
(contributor)



fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

upstream

owner_user/repo_name

master

de6cd85

de6cd85

ce9ef85

ce9cd35

contributor_user/repo_name

feature

ce9ef85

master

de6cd85

ce9ef85

ce9cd35

origin

Pull

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

local

contributor_user/repo_name

master

ce9ef85

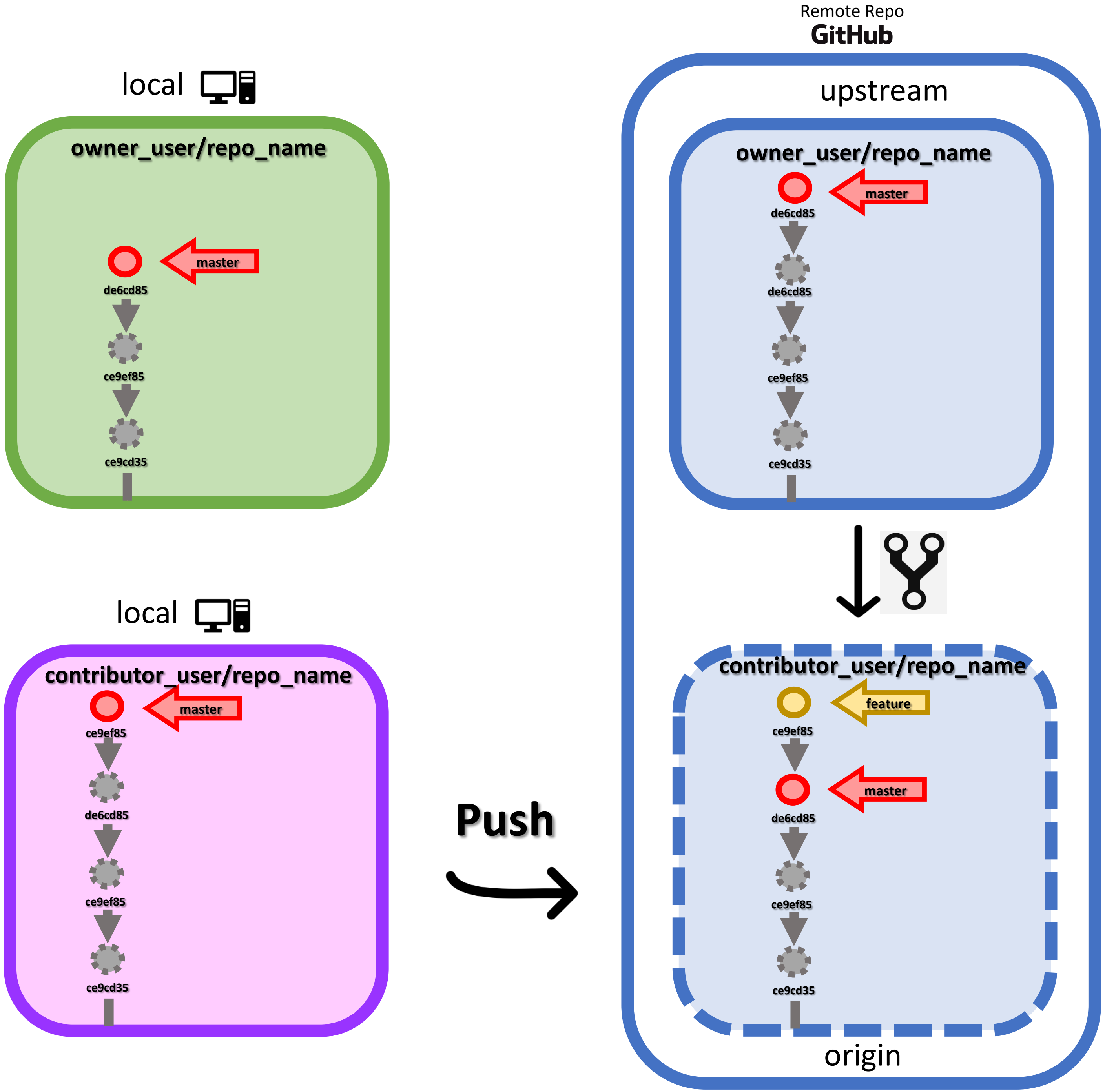
de6cd85

ce9ef85

ce9cd35

fake-sinzi
(owner)

s1nzy
(contributor)



Remote Repo
GitHub

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

local

contributor_user/repo_name

master

ce9ef85

de6cd85

ce9ef85

ce9cd35

Push

upstream

owner_user/repo_name

master

de6cd85

de6cd85

ce9ef85

ce9cd35

contributor_user/repo_name

feature

ce9ef85

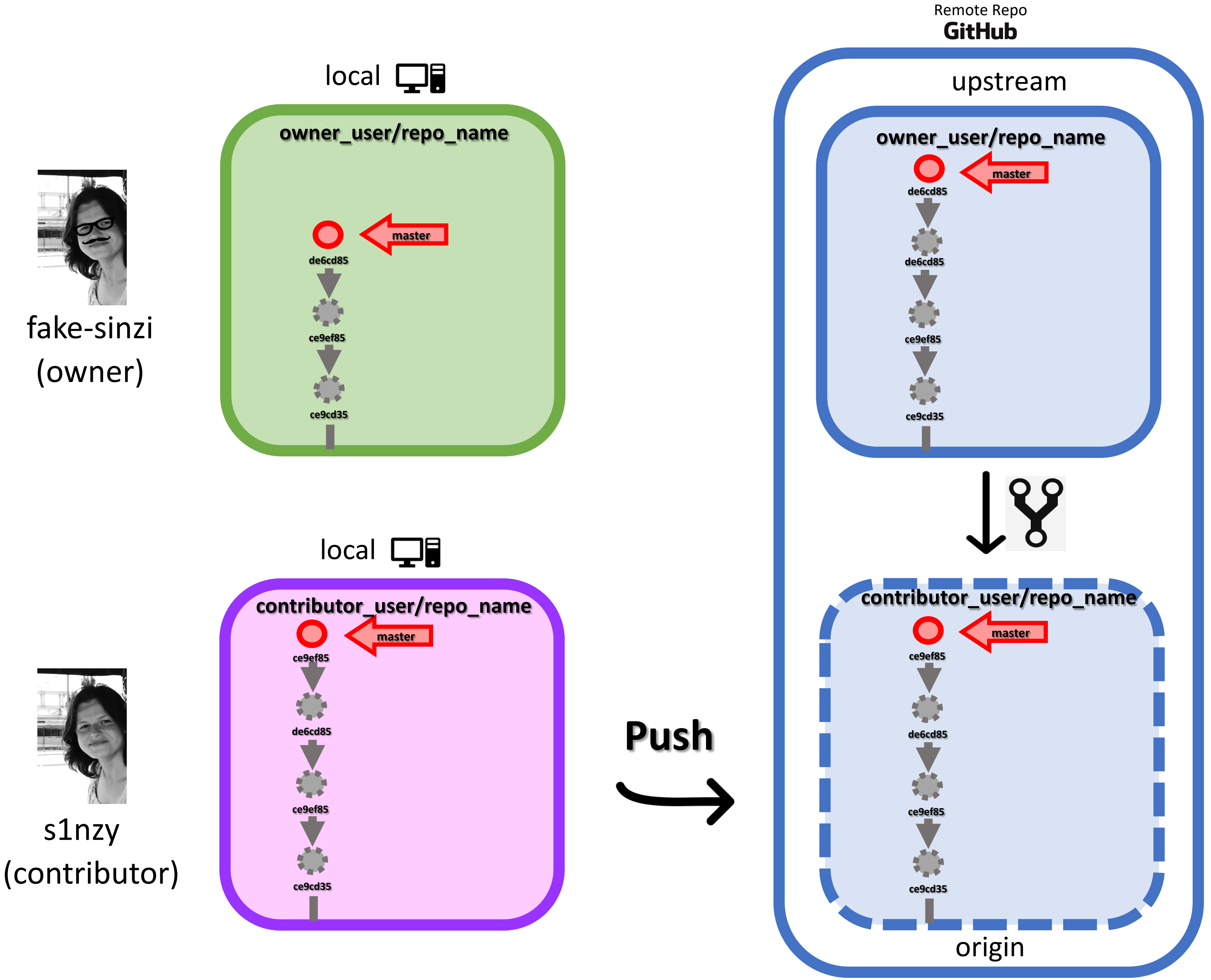
master

de6cd85

ce9ef85

ce9cd35

origin



Remote Repo
GitHub

local

owner_user/repo_name

master

de6cd85

ce9ef85

ce9cd35

fake-sinzi
(owner)

upstream

owner_user/repo_name

master

de6cd85

de6cd85

ce9ef85

ce9cd35

local

contributor_user/repo_name

master

ce9ef85

de6cd85

ce9ef85

ce9cd35

s1nzy
(contributor)

Push

contributor_user/repo_name

master

ce9ef85

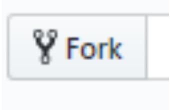
de6cd85

ce9ef85

ce9cd35

origin

How to fork a repo?

- Search the repository you are interested in
  - Owner_user/repository_name (e.g. “s1nzy/Github_Tutorial”)
- Click on the *Fork* button, next to the repo name 

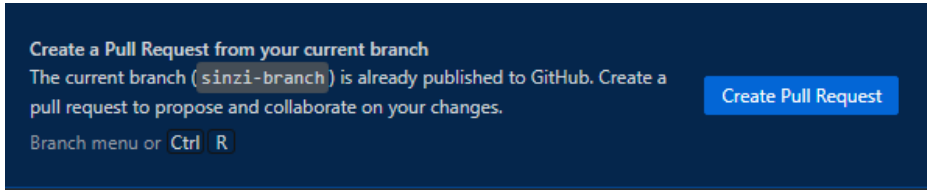
- The repo appears as one of your own repos
  - your_username/repository_name (e.g.“fake-sinzi/Github_Tutorial”)
- Clone the repository to your computer
- Strongly advised to work on a separate branch
- Once you are happy with your changes, push them to your forked remote repo (origin)
- Create a pull request to merge them with the owner’s repo (upstream)

Pull request (PR)

s1nzy

Contributor

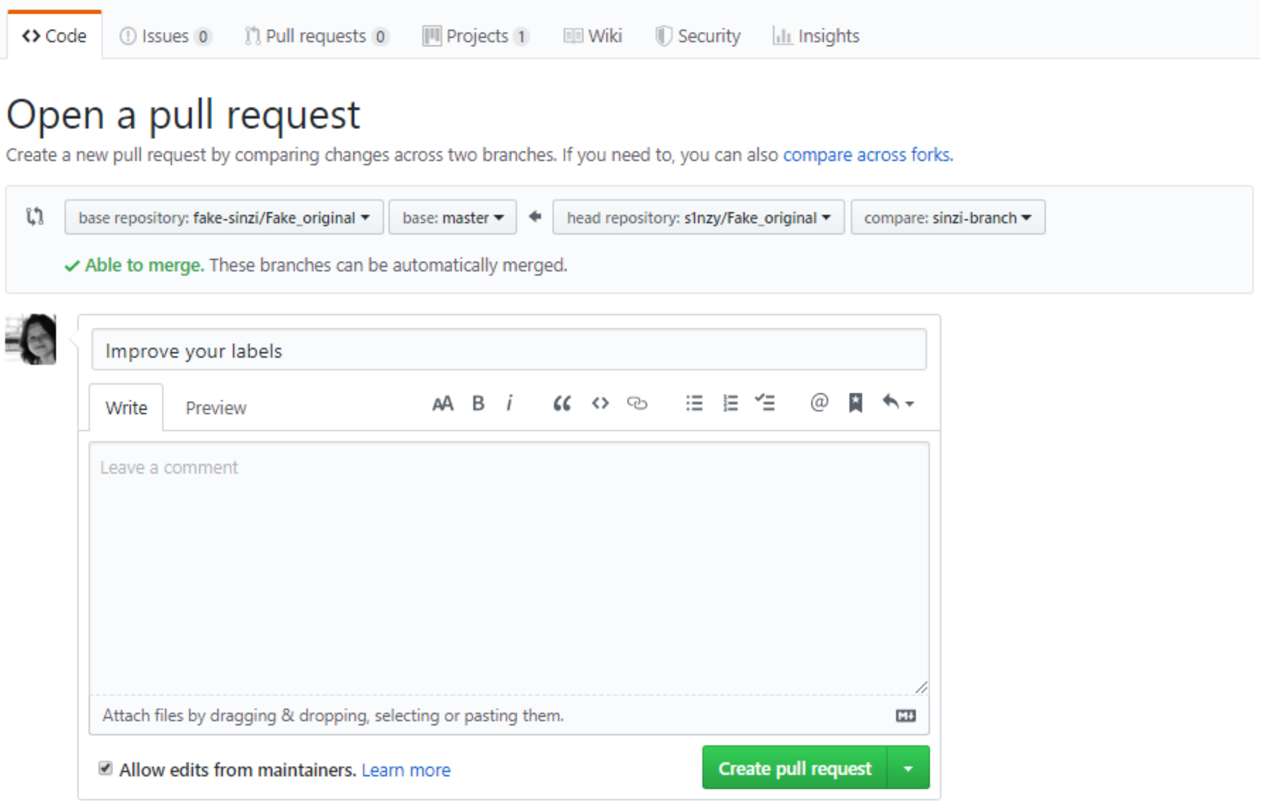
- Checkout your local *branch*
- Go to *Create Pull Request*
- Redirects you *to GitHub*



Create a Pull Request from your current branch

The current branch (`sinzi-branch`) is already published to GitHub. Create a pull request to propose and collaborate on your changes.

Branch menu or Ctrl R



Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also compare across forks.

base repository: fake-sinzi/Fake_original ▾ base: master ▾ ← head repository: s1nzy/Fake_original ▾ compare: sinzi-branch ▾

✓ Able to merge. These branches can be automatically merged.

Improve your labels

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

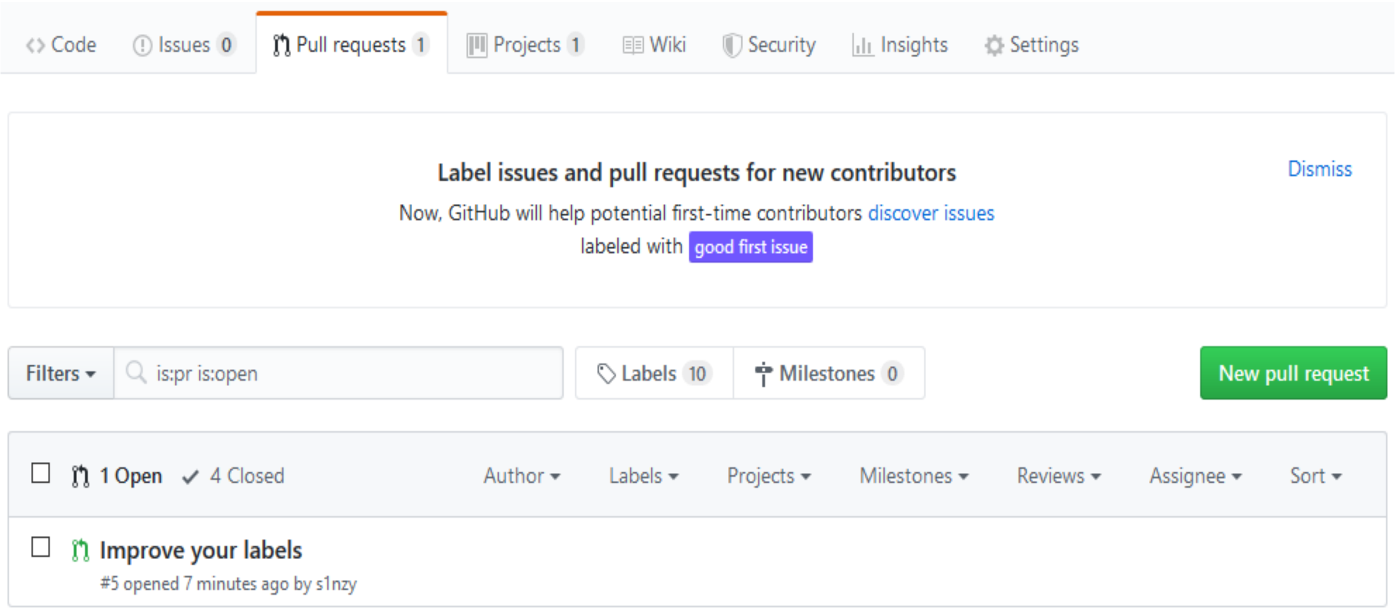
☑ Allow edits from maintainers. Learn more

Pull request (PR)

fake-sinzi

Owner

- You get an e-mail about this
- Go to your remote repo on GitHub



Label issues and pull requests for new contributors

Now, GitHub will help potential first-time contributors discover issues labeled with good first issue

□ **Improve your labels**

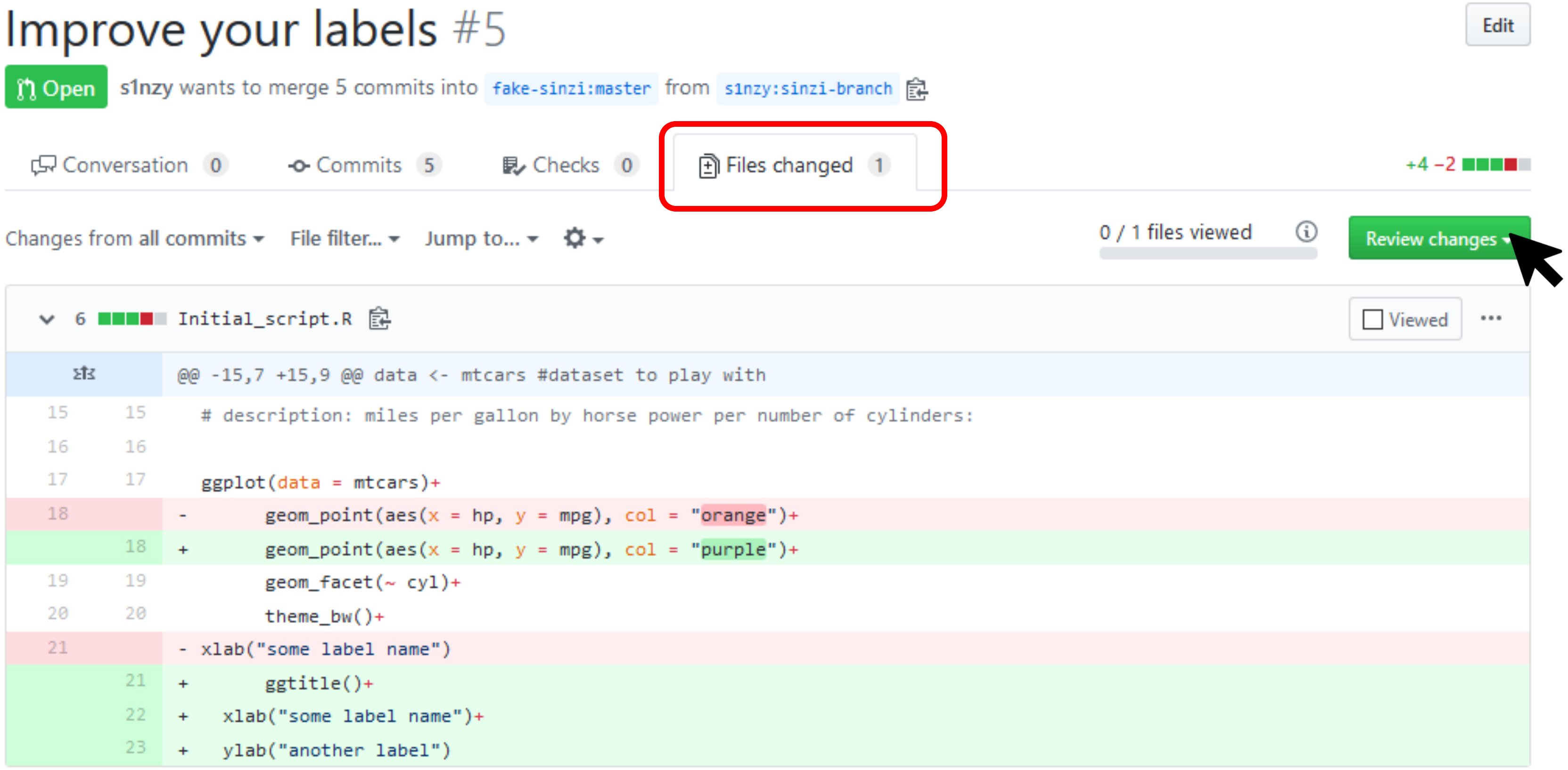
#5 opened 7 minutes ago by s1nzy

Pull request (PR)

fake-sinzi

Owner

- Time to give some feedback



Improve your labels #5

s1nzy wants to merge 5 commits into `fake-sinzi:master` from `s1nzy:sinzi-branch`

6 Initial_script.R

```
@@ -15,7 +15,9 @@ data <- mtcars #dataset to play with
  # description: miles per gallon by horse power per number of cylinders:

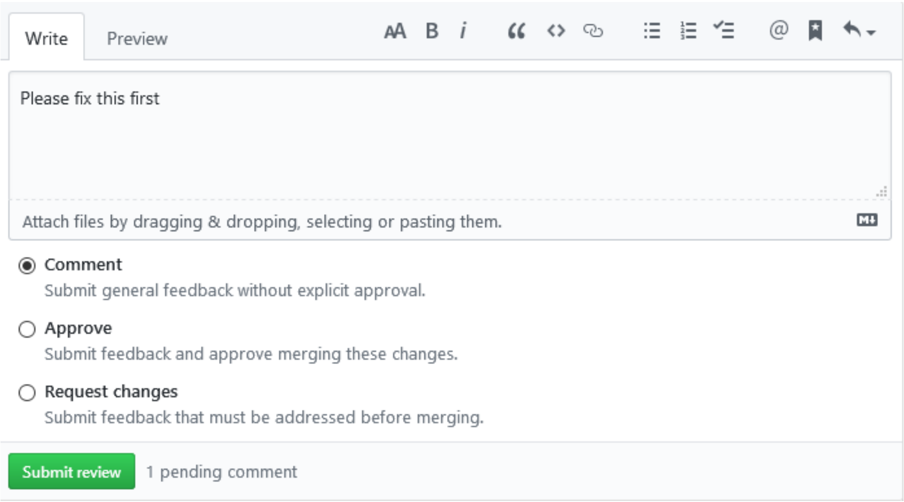
  ggplot(data = mtcars)+
-        geom_point(aes(x = hp, y = mpg), col = "orange")+
+        geom_point(aes(x = hp, y = mpg), col = "purple")+
         geom_facet(~ cyl)+
         theme_bw()+
- xlab("some label name")
+        ggtitle()+
+   xlab("some label name")+
+   ylab("another label")
```

Pull request (PR)

fake-sinzi

Owner

- Click and drag on the lines you want to comment on
- (they become highlighted)
- Click on Start a review
- When you are satisfied go to Finish your review 1 ▾



Please fix this first

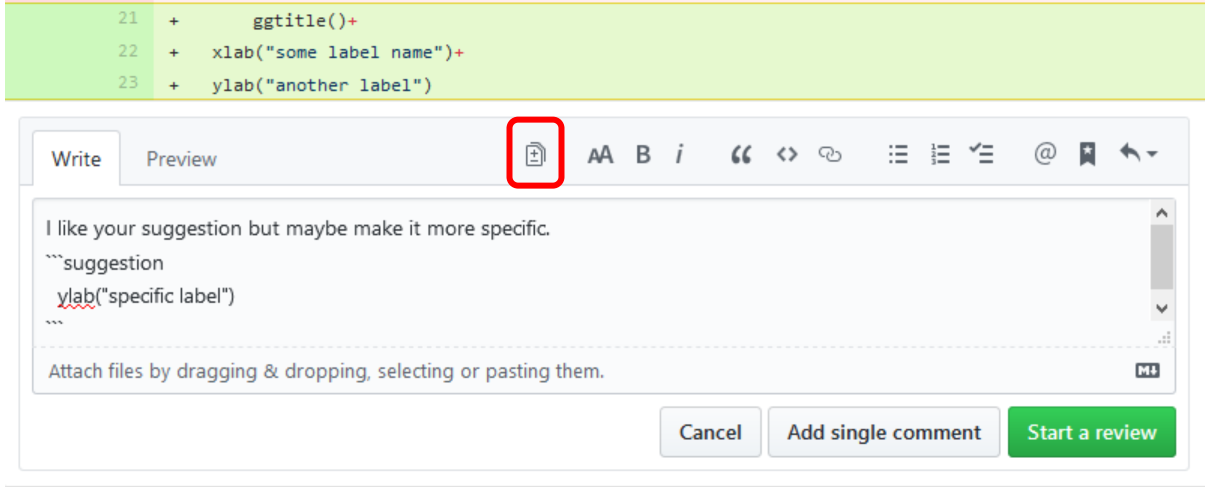
Attach files by dragging & dropping, selecting or pasting them.

● Comment
Submit general feedback without explicit approval.

○ Approve
Submit feedback and approve merging these changes.

○ Request changes
Submit feedback that must be addressed before merging.

Submit review
1 pending comment



```
+      ggtitle()+
+  xlab("some label name")+
+  ylab("another label")
```

I like your suggestion but maybe make it more specific.

~~~
```suggestion
 ylab("specific label")
```
~~~

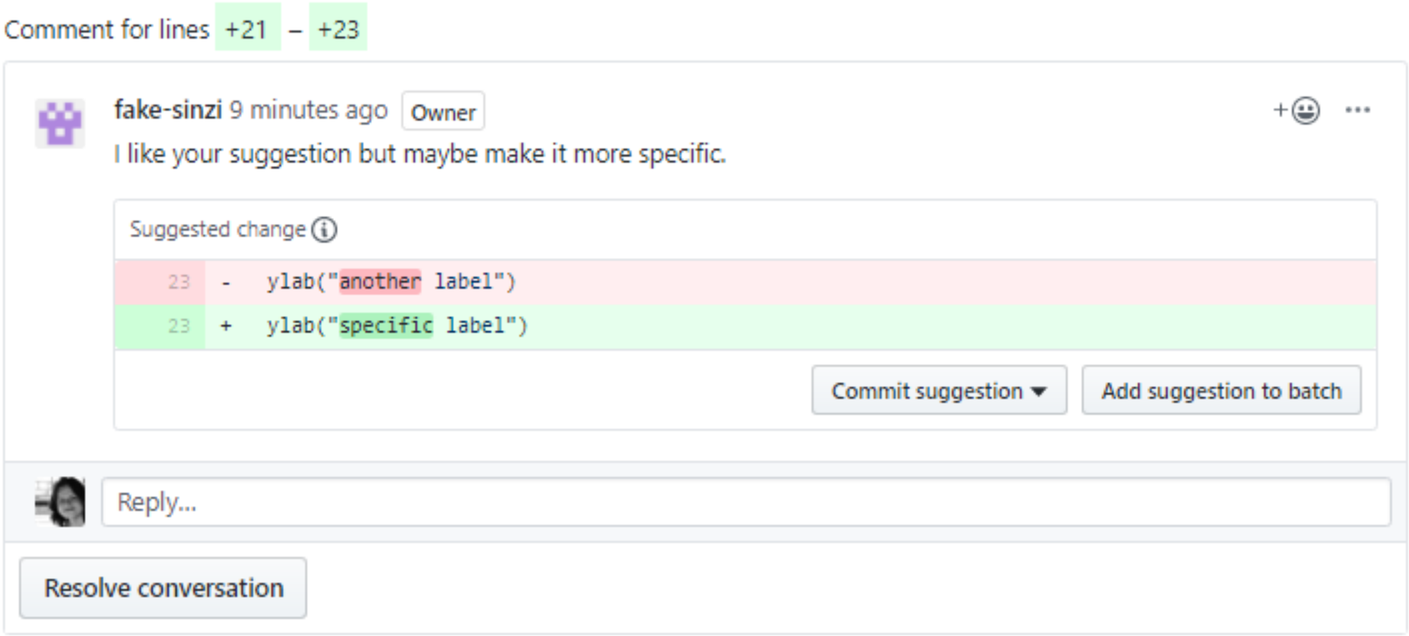
Attach files by dragging & dropping, selecting or pasting them.
Cancel
Add single comment
Start a review

Pull request (PR)

Contributor

s1nzy

- Go to Rscript.R and make change
- Commit & Push



Comment for lines +21 – +23

fake-sinzi 9 minutes ago Owner

I like your suggestion but maybe make it more specific.

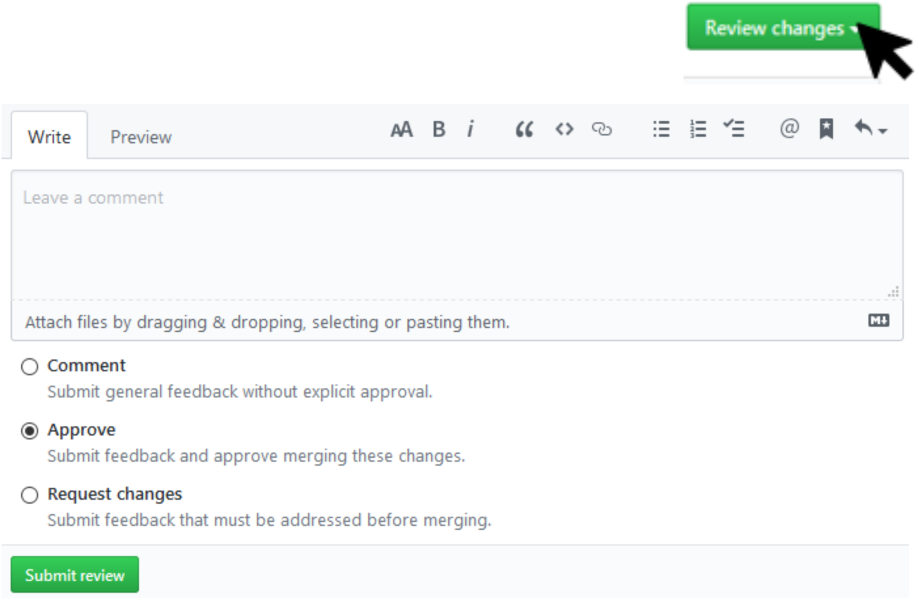
Suggested change

```
23  -   ylab("another label")
23  +   ylab("specific label")
```

Pull request (PR)

Owner

fake-sinzi



Review changes

Write Preview

Leave a comment

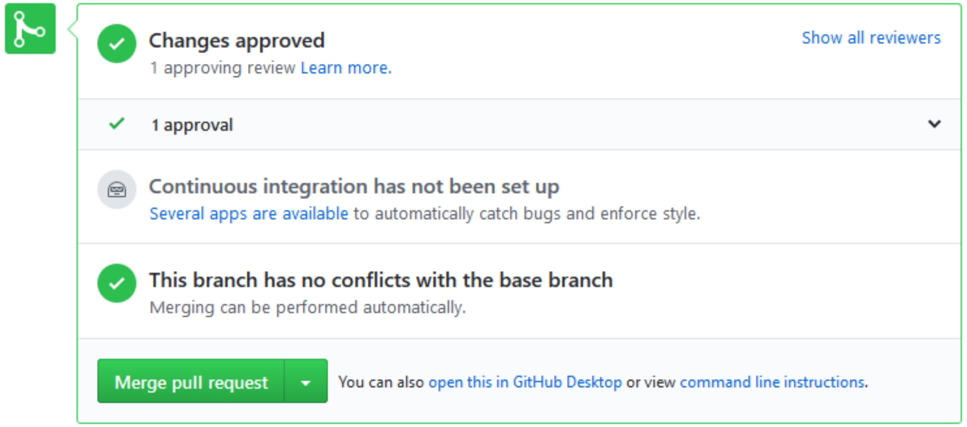
Attach files by dragging & dropping, selecting or pasting them.

○ Comment
Submit general feedback without explicit approval.

● Approve
Submit feedback and approve merging these changes.

○ Request changes
Submit feedback that must be addressed before merging.

Submit review



✓ Changes approved
1 approving review Learn more.
Show all reviewers

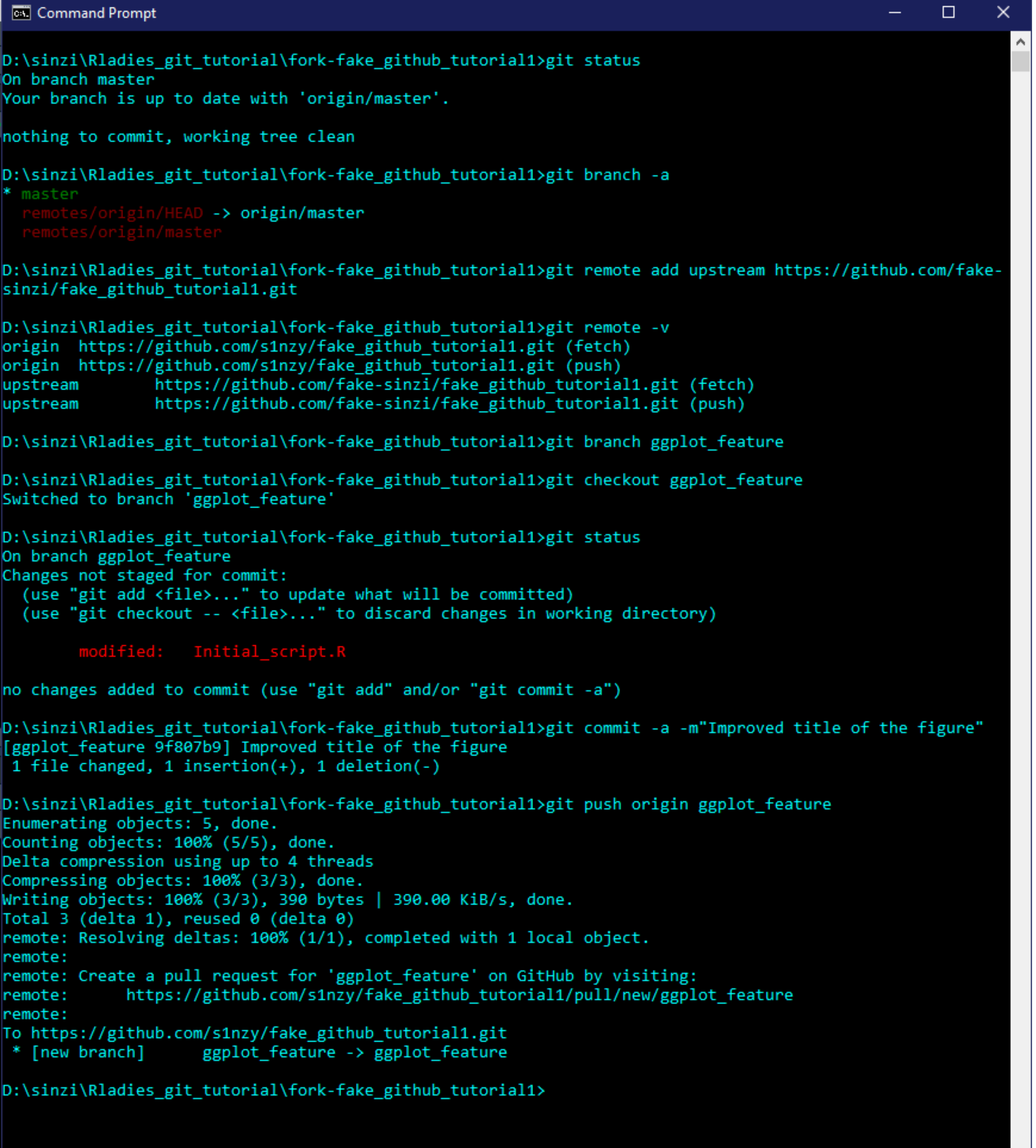
✓ 1 approval

Continuous integration has not been set up
Several apps are available to automatically catch bugs and enforce style.

✓ This branch has no conflicts with the base branch
Merging can be performed automatically.

Merge pull request ▾ You can also open this in GitHub Desktop or view command line instructions.

- Confirm merge
- Pull request closes automatically



```
D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git status
On branch master
Your branch is up to date with 'origin/master'.

nothing to commit, working tree clean

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git branch -a
* master
  remotes/origin/HEAD -> origin/master
  remotes/origin/master

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git remote add upstream https://github.com/fake-
sinzi/fake_github_tutorial1.git

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git remote -v
origin  https://github.com/s1nzy/fake_github_tutorial1.git (fetch)
origin  https://github.com/s1nzy/fake_github_tutorial1.git (push)
upstream        https://github.com/fake-sinzi/fake_github_tutorial1.git (fetch)
upstream        https://github.com/fake-sinzi/fake_github_tutorial1.git (push)

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git branch ggplot_feature

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git checkout ggplot_feature
Switched to branch 'ggplot_feature'

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git status
On branch ggplot_feature
Changes not staged for commit:
  (use "git add <file>..." to update what will be committed)
  (use "git checkout -- <file>..." to discard changes in working directory)

        modified:   Initial_script.R

no changes added to commit (use "git add" and/or "git commit -a")

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git commit -a -m"Improved title of the figure"
[ggplot_feature 9f807b9] Improved title of the figure
 1 file changed, 1 insertion(+), 1 deletion(-)

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>git push origin ggplot_feature
Enumerating objects: 5, done.
Counting objects: 100% (5/5), done.
Delta compression using up to 4 threads
Compressing objects: 100% (3/3), done.
Writing objects: 100% (3/3), 390 bytes | 390.00 KiB/s, done.
Total 3 (delta 1), reused 0 (delta 0)
remote: Resolving deltas: 100% (1/1), completed with 1 local object.
remote:
remote: Create a pull request for 'ggplot_feature' on GitHub by visiting:
remote:      https://github.com/s1nzy/fake_github_tutorial1/pull/new/ggplot_feature
remote:
To https://github.com/s1nzy/fake_github_tutorial1.git
 * [new branch]      ggplot_feature -> ggplot_feature

D:\sinzi\Rladies_git_tutorial\fork-fake_github_tutorial1>
```

Using the CMD line

`git status`

which branch is checked-out and if it is up to date with the origin

`git branch -a`

shows all branches (local and remote)

`git remote add upstream <link to owner/repo>`

adds the upstream repository (same link as with cloning)

`git remote -v`

shows all remotes

`git branch branch_name`

creates new branch

`git checkout branch_name`

switches to branch

`git commit –a –m ”message”`

adds file to staging area and commits changes

`git push remote_name branch_name`

updates remote repo on github with the new branch

You now have the option to make a PR by copy-pasting the link into your browser

Pull request

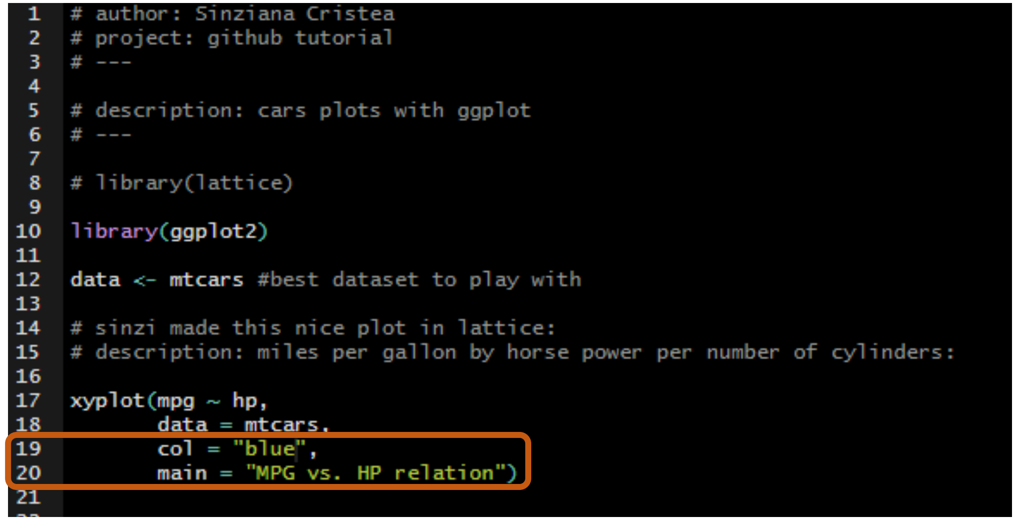
- You are directed to GitHub and you manage the PR from there as shown above.
- Your PR is approved and merged into the upstream master by the repo owner
- Congrats! You just made your first contribution!

Learn by doing! Hands-on part 2

- Work in pairs:
- Find each other’s repos and Fork your partner’s repo
- Clone the forked repo to your laptop (local forked repo)
- Create a new branch in the forked repo
  - Change the lattice plot to a ggplot
  - Push branch to origin
- Create pull request (PR) to merge your change to upstream master → become a collaborator
- Go to github to review PR for your own repo, make comments, code suggestions and merge it to your own repo.

Bonus: How to deal with *conflicts*?

- Situation:
- Ooops! You forgot to add the title of the plot and you decided to change the colour of the points to match the Rladies theme.
- You are unaware that your collaborator made changes to the same lines
- You make the changes on your branch and submit a PR
- You see a message that the merge cannot be done automatically because there is a conflict.
- What to do?



```
# author: Sinziana Cristea
# project: github tutorial
# ---

# description: cars plots with ggplot
# ---

# library(lattice)

library(ggplot2)

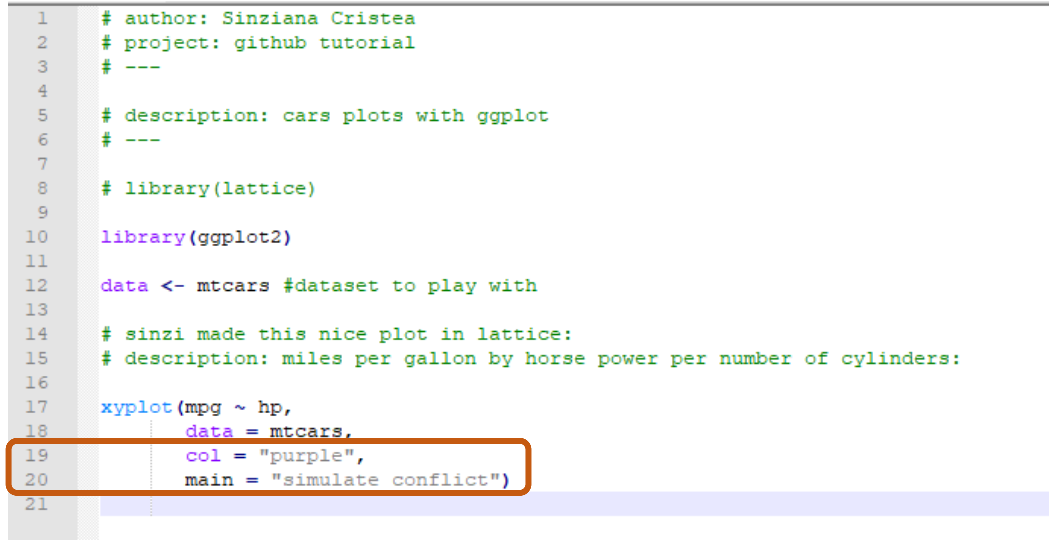
data <- mtcars #best dataset to play with

# sinzi made this nice plot in lattice:
# description: miles per gallon by horse power per number of cylinders:

xyplot(mpg ~ hp,
       data = mtcars,
       col = "blue",
       main = "MPG vs. HP relation")
```

master

Merge



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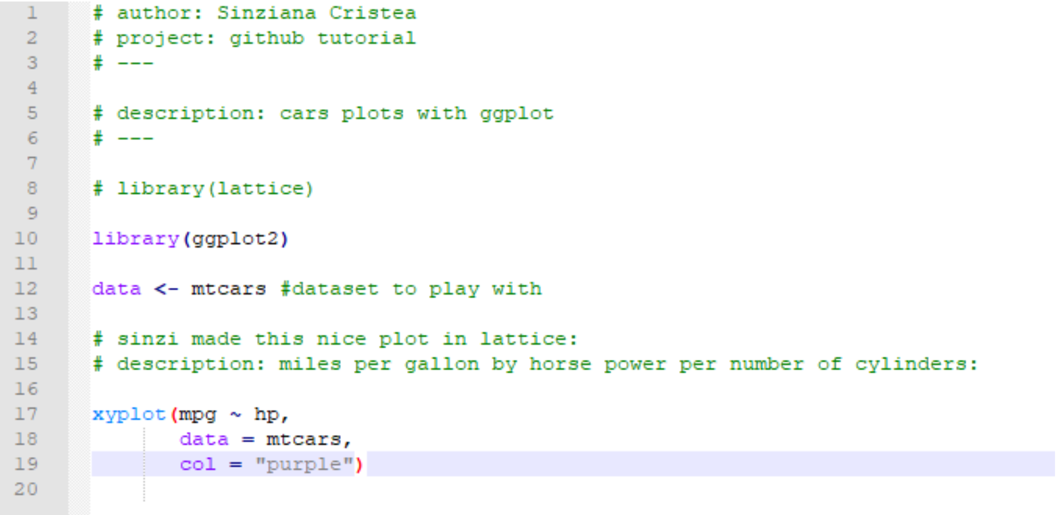
data <- mtcars #dataset to play with

# sinzi made this nice plot in lattice:
# description: miles per gallon by horse power per number of cylinders:

xyplot(mpg ~ hp,
       data = mtcars,
       col = "purple",
       main = "simulate conflict")
```

feature



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# project: github tutorial
# ---

# description: cars plots with ggplot
# ---

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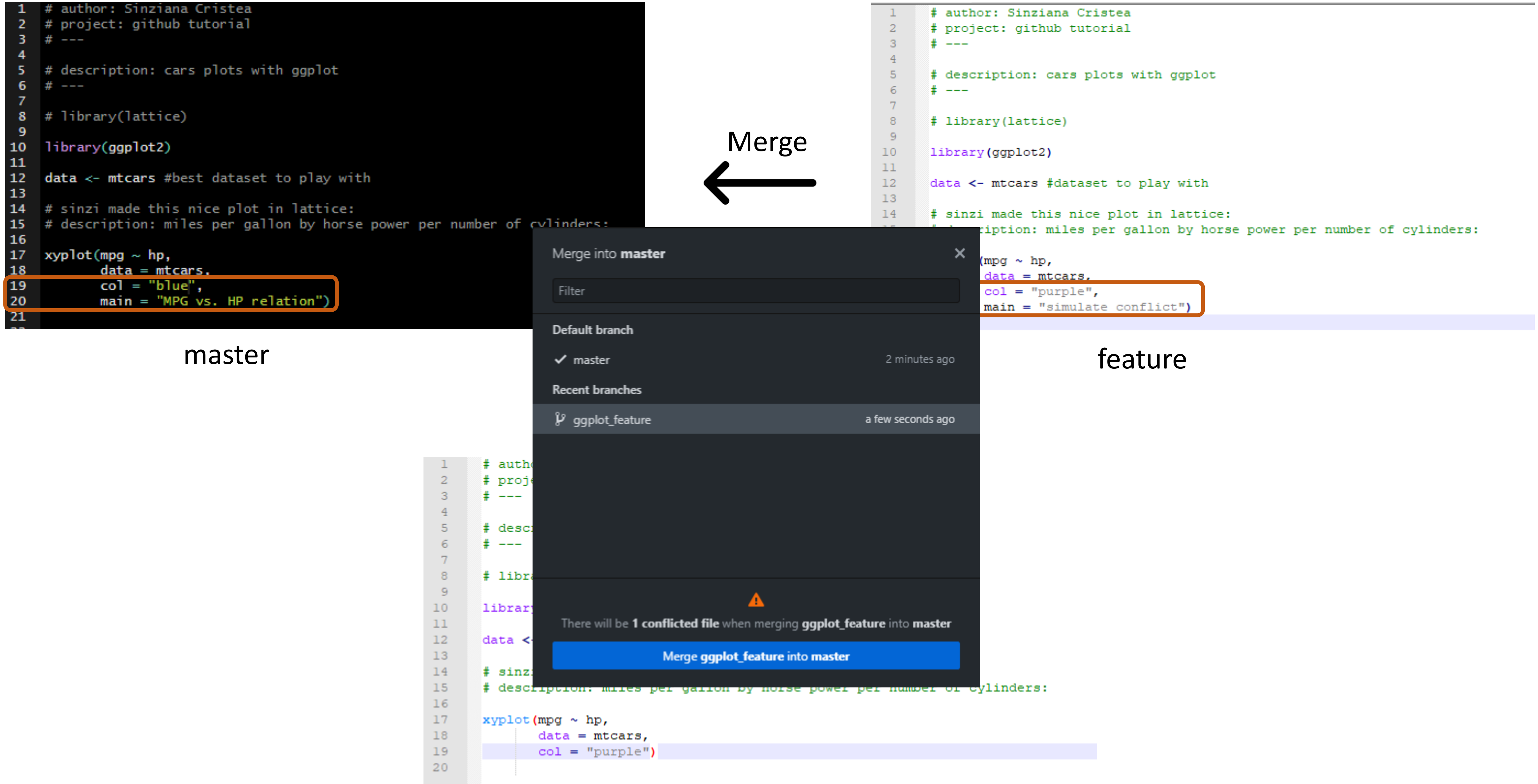
# description: miles per gallon by horse power per number of cylinders:

xyplot(mpg ~ hp,
       data = mtcars,
       col = "purple")
```

Original file



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# author: Sinziana Cristea
# project: github tutorial
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# description: cars plots with ggplot
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data <- mtcars #best dataset to play with

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# description: miles per gallon by horse power per number of cylinders:

xyplot(mpg ~ hp,
       data = mtcars,
       col = "blue",
       main = "MPG vs. HP relation")
```

master

Merge

```
# author: Sinziana Cristea
# project: github tutorial
# ---

# description: cars plots with ggplot
# ---

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ription: miles per gallon by horse power per number of cylinders:

(mpg ~ hp,
 data = mtcars,
 col = "purple",
 main = "simulate conflict")
```

feature

Merge into **master**

Default branch

✓ master — 2 minutes ago

Recent branches

ggplot_feature — a few seconds ago

⚠ There will be **1 conflicted file** when merging **ggplot_feature** into **master**

```
# auth
# proj
# ---

# desc
# ---

# libr

library

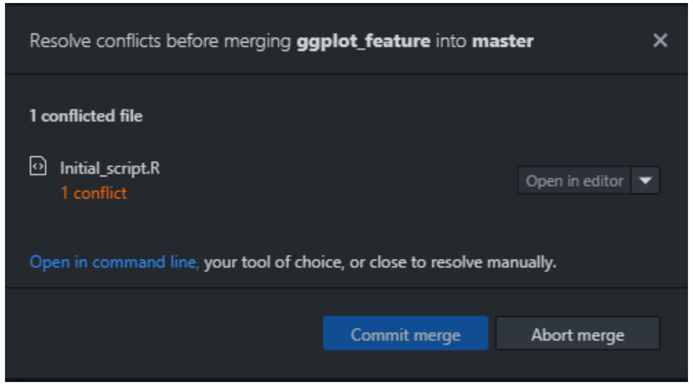
data <

# sinz
# description: miles per gallon by horse power per number of cylinders:

xyplot(mpg ~ hp,
       data = mtcars,
       col = "purple")
```

Original file

Solving the conflict



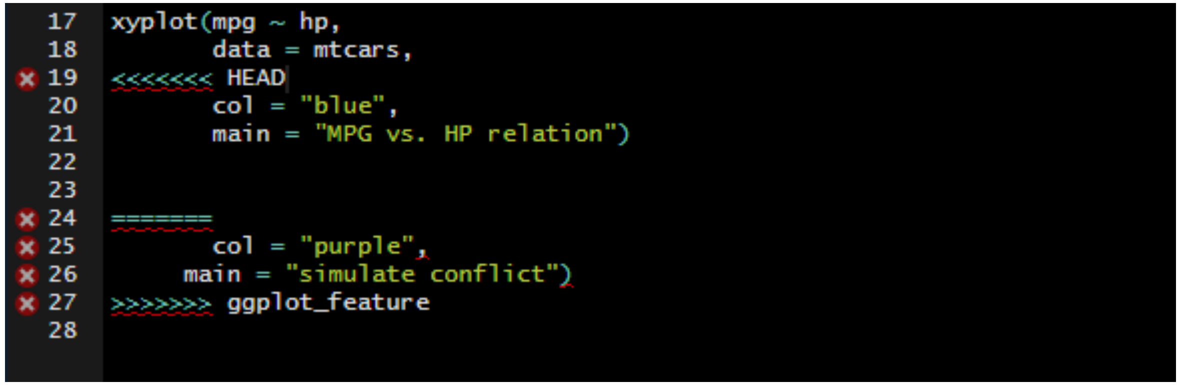
Resolve conflicts before merging **ggplot_feature** into **master**

1 conflicted file

Initial_script.R
1 conflict

Open in command line, your tool of choice, or close to resolve manually.

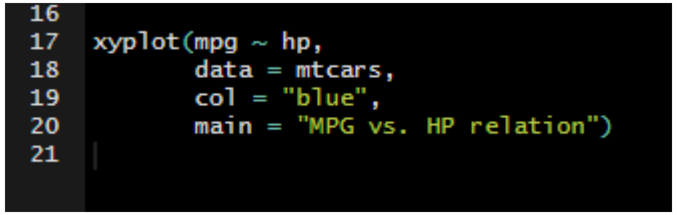
Go to editor



```
xyplot(mpg ~ hp,
       data = mtcars,
<<<<<<< HEAD
       col = "blue",
       main = "MPG vs. HP relation")


=======
       col = "purple",
     main = "simulate conflict")
>>>>>>> ggplot_feature
```

Manual edit & save



```
xyplot(mpg ~ hp,
       data = mtcars,
       col = "blue",
       main = "MPG vs. HP relation")
```

Merge successful!

Recap & Take-home

- Basic workflow with git command and GitDesktop
  - Create local and remote repositories
  - Make commits
  - Work with multiple branches:
    - Have more versions of your script
    - Work with others
  - Fork a repository
  - Create a pull request
  - Review and merge a pull request

Additional resources

- Github hello world

  https://guides.github.com/activities/hello-world/#commit
- David Mahler on YouTube: https://www.youtube.com/watch?v=Gg4bLk8cGNo
- Working with the CMD line

  https://github.github.com/training-kit/downloads/github-git-cheat-sheet/
- How repos work:
- https://marklodato.github.io/visual-git-guide/index-en.html
- https://ohshitgit.com/
- http://git-school.github.io/visualizing-git/#free

Fin