Version Control with Git

- Before we start
    - Sign up at github.com
    - Partner up with the person next to you

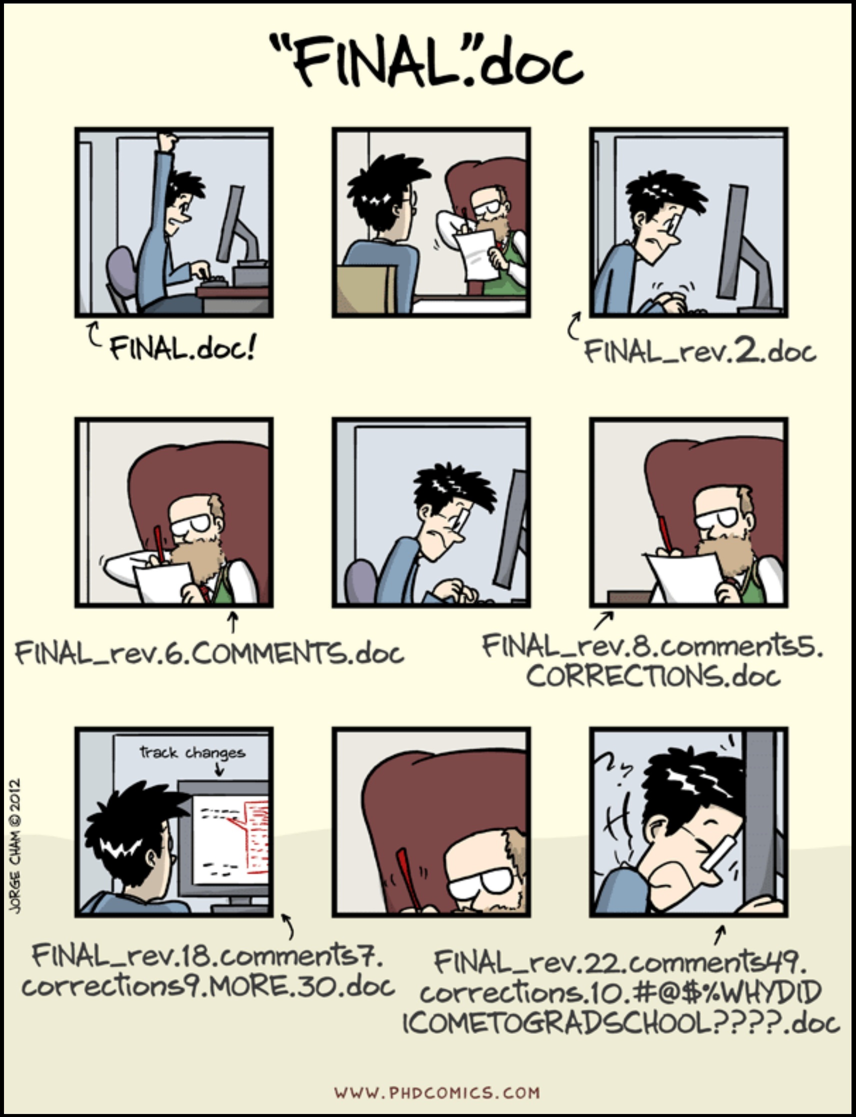
What is Version Control?

(AKA revision control, source control)

- Tracks <u>changes</u> to files
- Any file can be tracked
- Text (.txt, .csv, .py, .c, .r etc.) works best
    - These allow smart *diff* / *merge* etc.

Why Use Version Control? #1

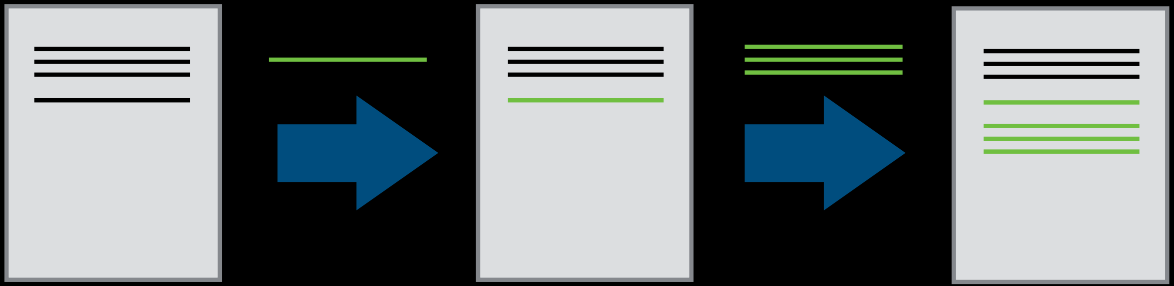
- A more efficient backup
- Reproducibility



Why Use Version Control? #2

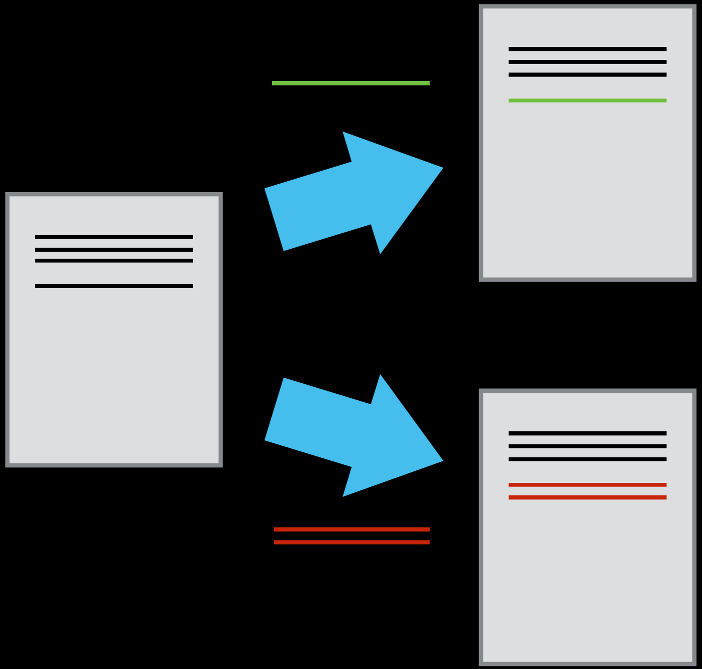
- Teamwork

Version Control Tracks Changes



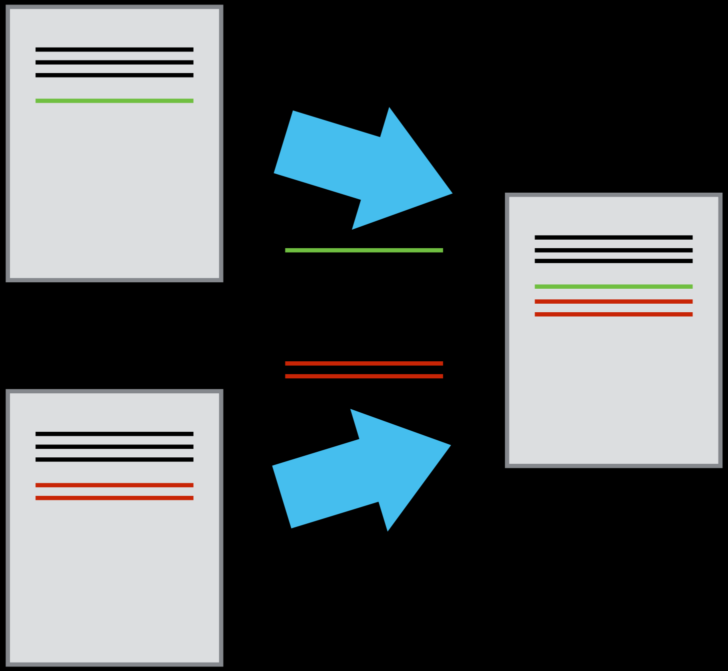
- Changes are tracked sequentially

Version Control Tracks Changes



- Different versions can be saved

Version Control Tracks Changes



- Multiple versions can be merged

Version Control Alternatives

- Subversion (svn) - Centralised
- Mercurial (hg) - Distributed
- Git (git) – Distributed

- N.B. GitHub != git

Local Configuration

- git config

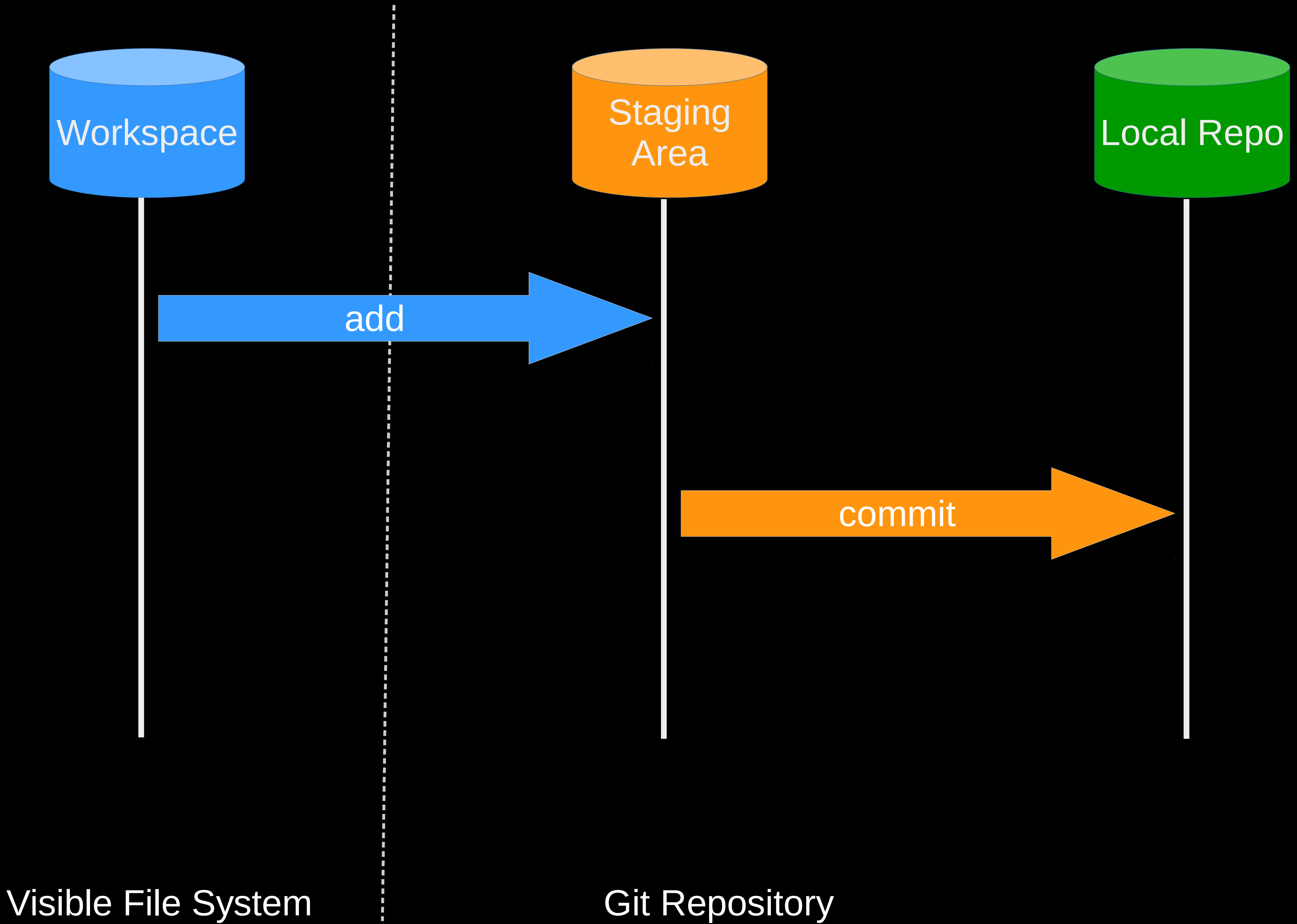
Creating a Repository

- git init
- git status

Tracking Changes to Files

- git add
- git commit

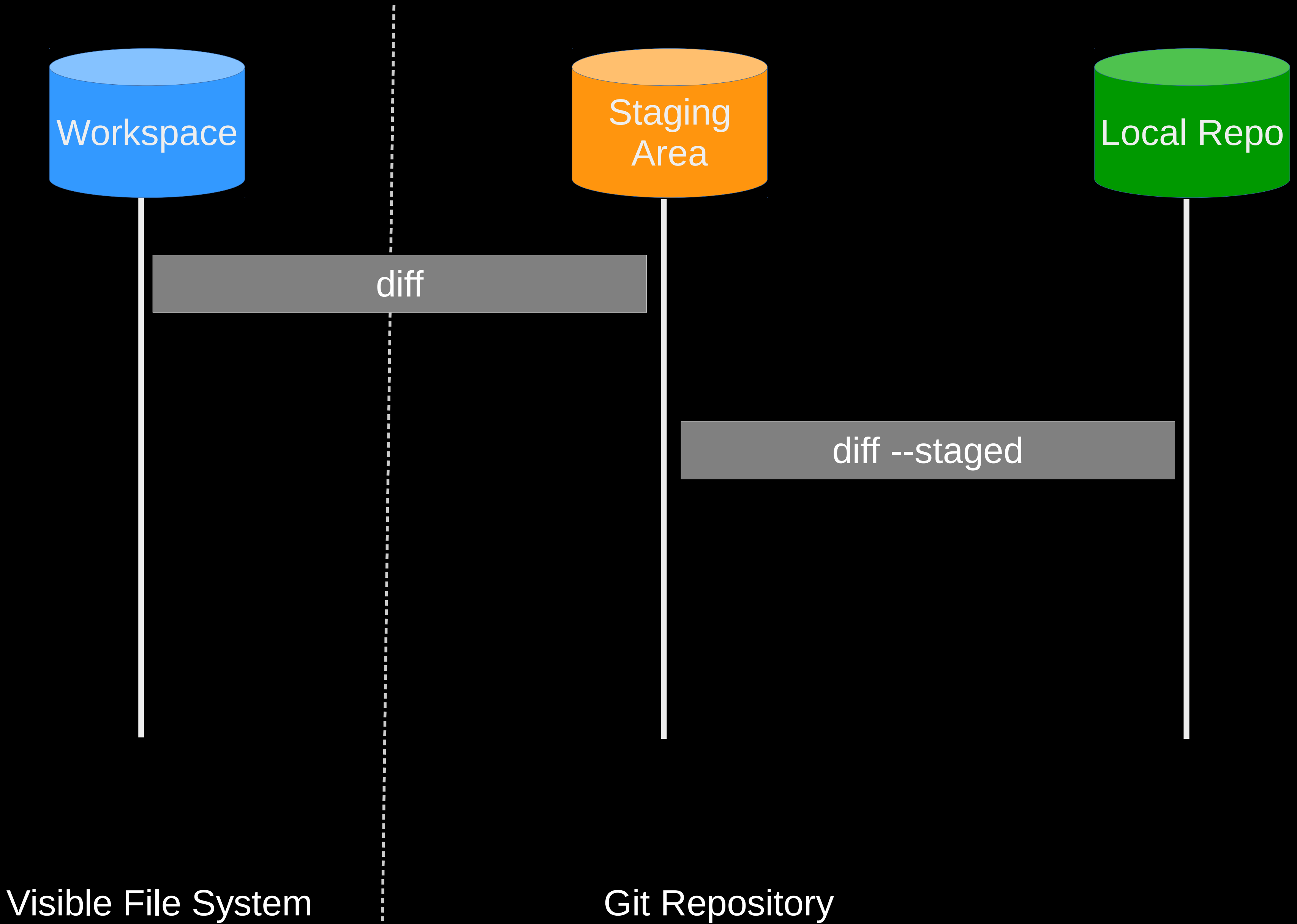
Git – add and commit



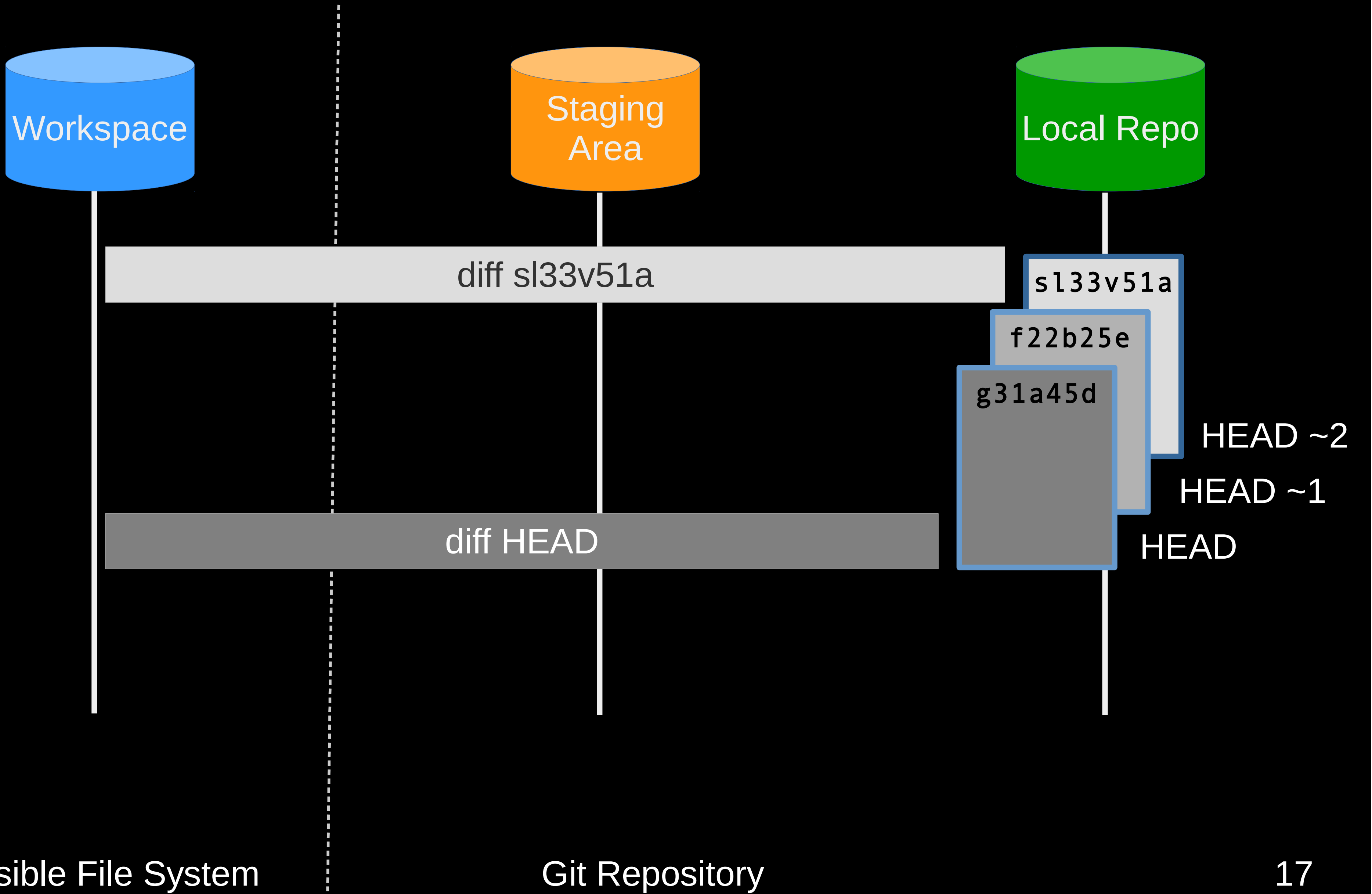
Exploring History #1

- git log
- git diff

Git – diff #1


Workspace
Staging Area
Local Repo
diff
diff --staged
Visible File System
Git Repository

Git – diff #2



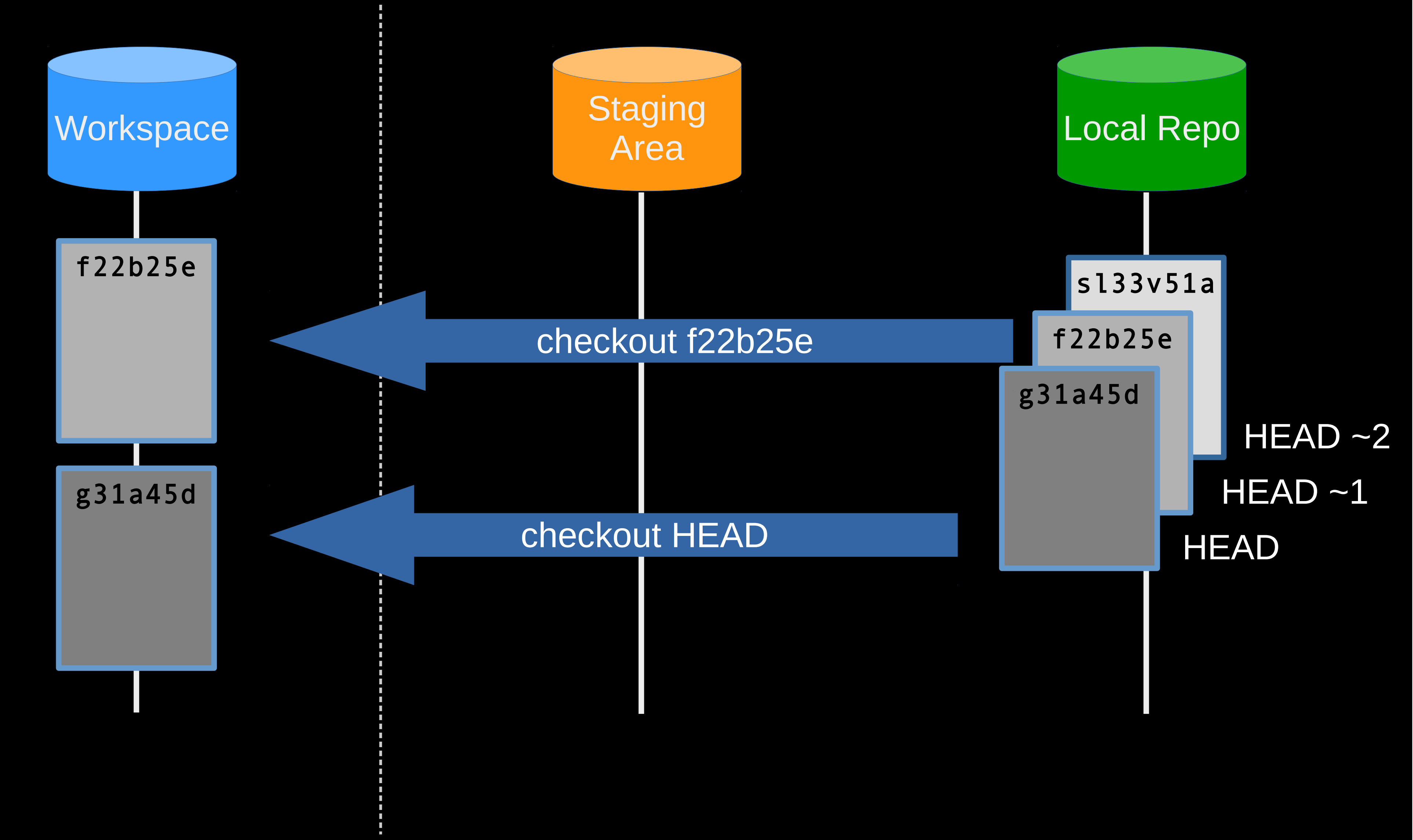
Visible File System

Git Repository

Restoring Files

- git checkout

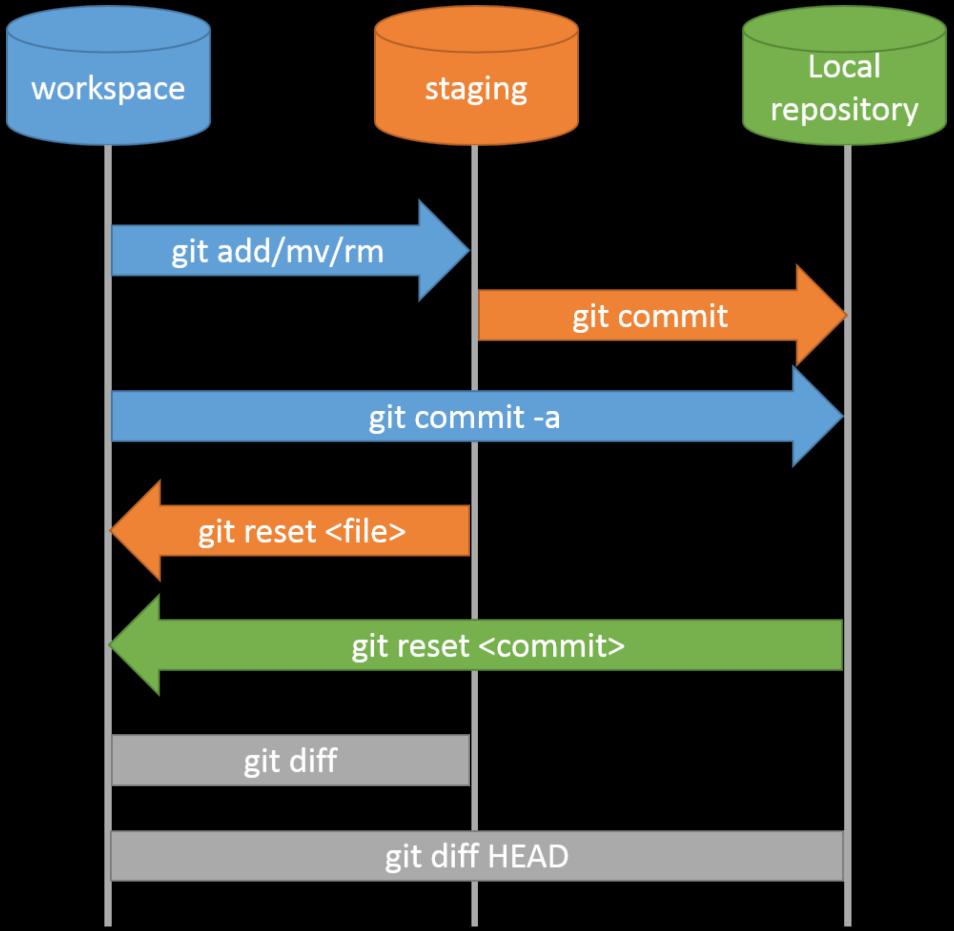
Git - restoration



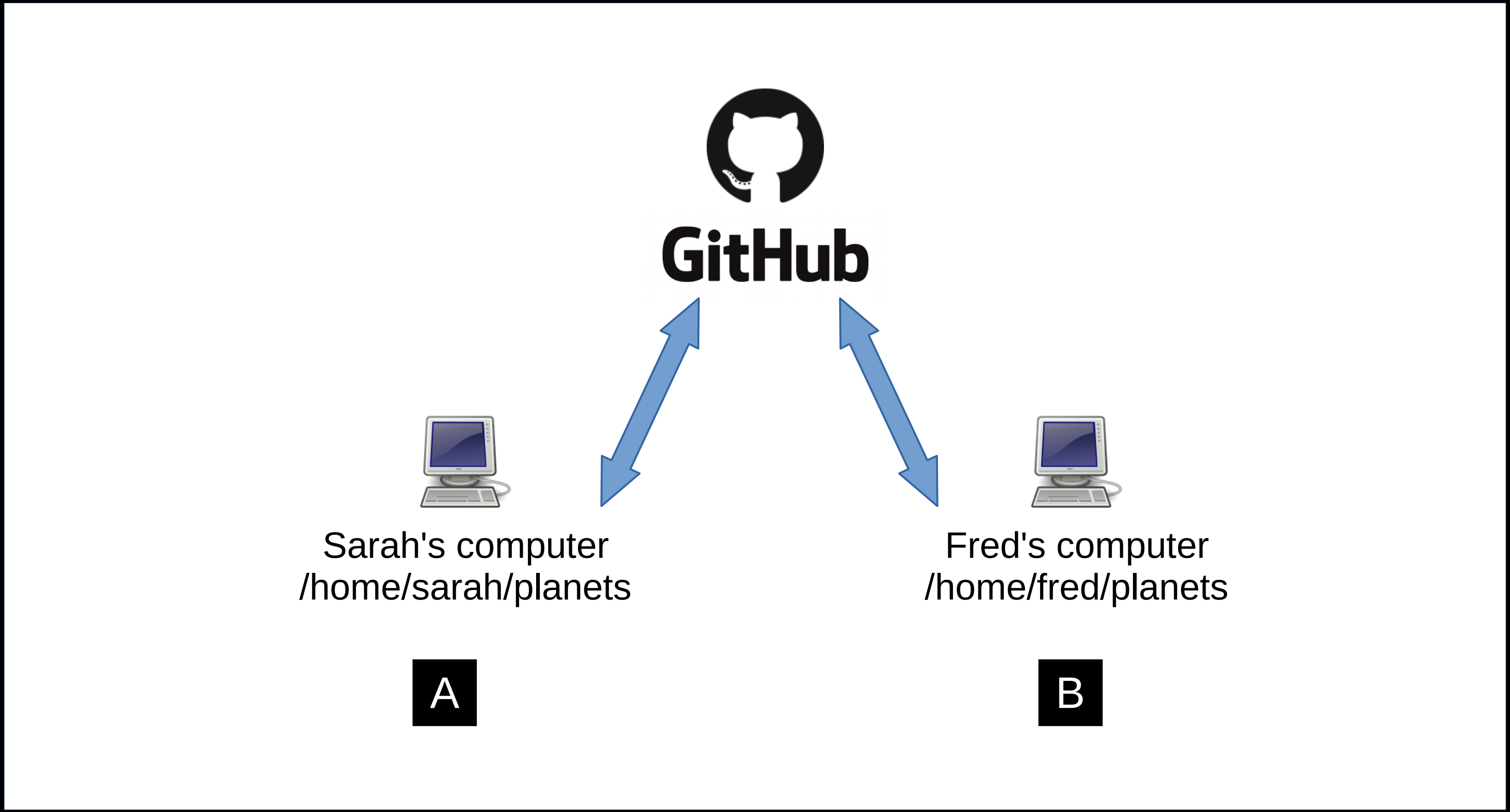
Visible File System

Git Repository

Git Workflow – Local Repo.



Collaboration



Sarah's computer
/home/sarah/planets

A

Fred's computer
/home/fred/planets

B

Collaboration

- Let's collaborate via remote repo
- Working in pairs:
- Developer A / Developer B

Collaboration:
Remote Repositories #1

- Developer A
  - Sign in https://github.com/
  - Create repository
  - git remote add
  - git push
  - Add Developer B as a collaborator

Collaboration: Remote Repositories #2

- Developer B
  - Clean up
  - git clone
  - git add
  - git commit
  - git push

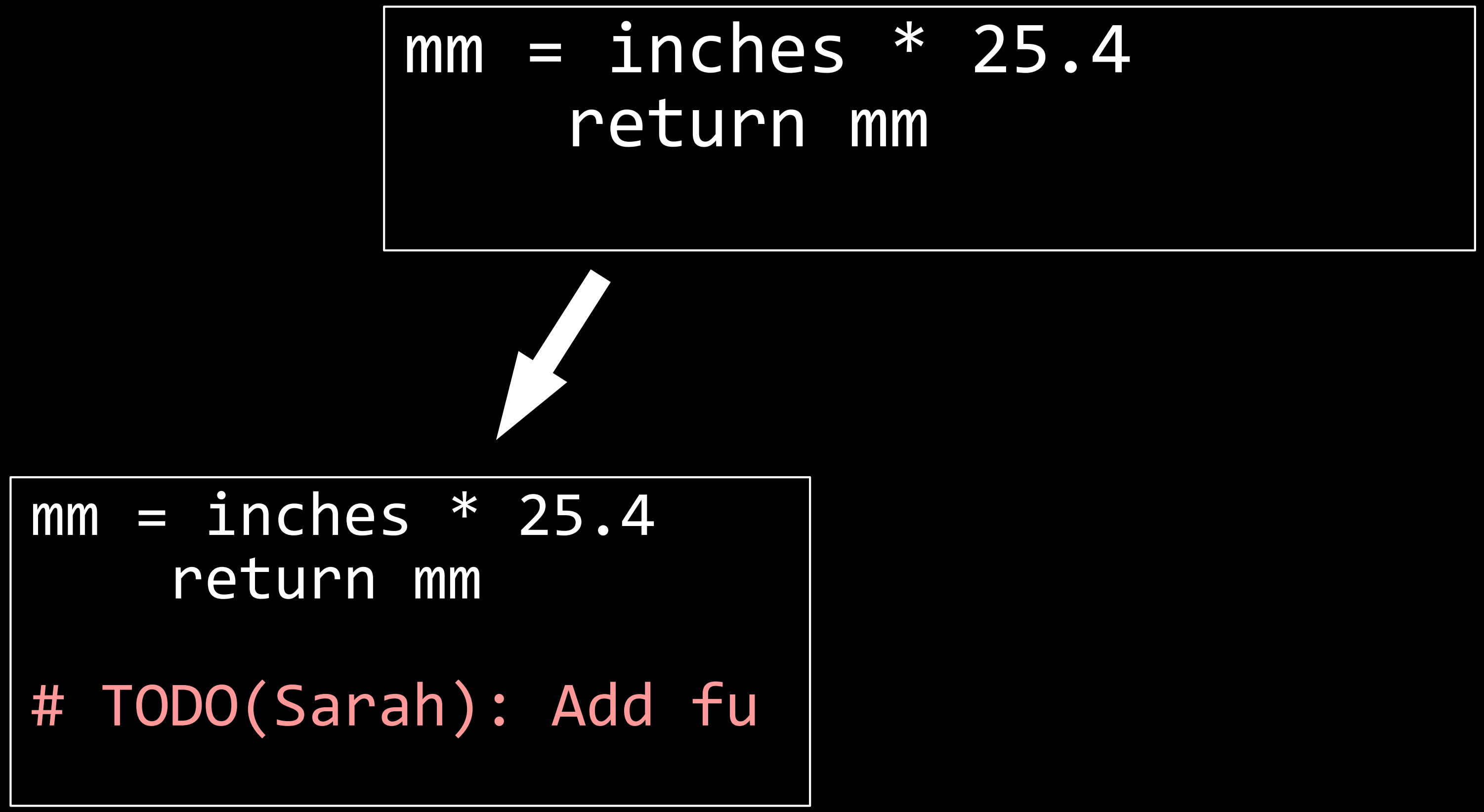
Collaboration: Remote Repositories #3

- Developer A
  - git pull

Collaboration: Remote Repositories #4

- Exercise
  - Developer A – Add README.md, (authors and info).
  - Developer B – sync up your repository

Collaboration: Conflicts #1



```
mm = inches * 25.4
    return mm
```

```
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# TODO(Sarah): Add fu
```
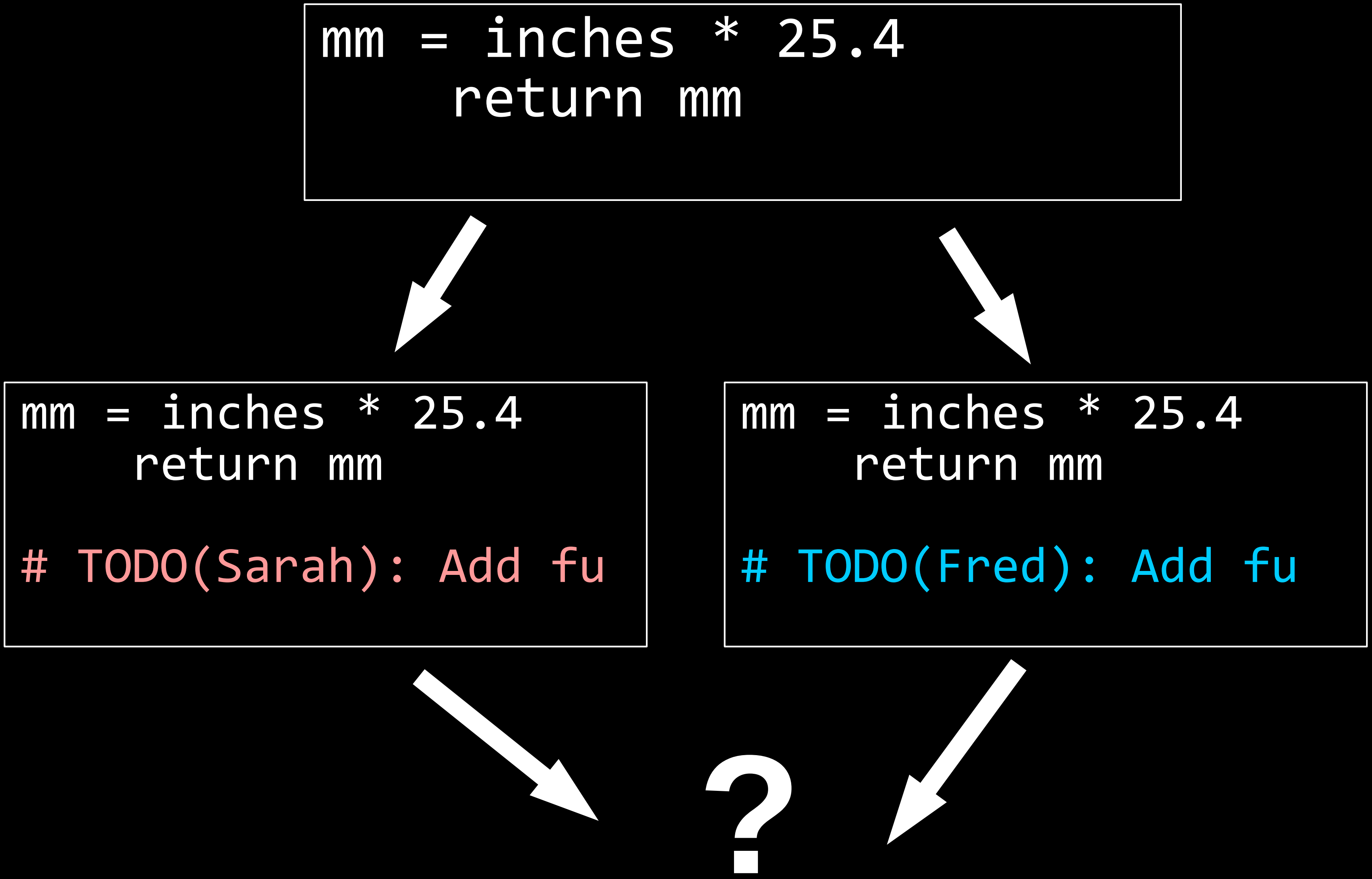

Collaboration: Conflicts #2



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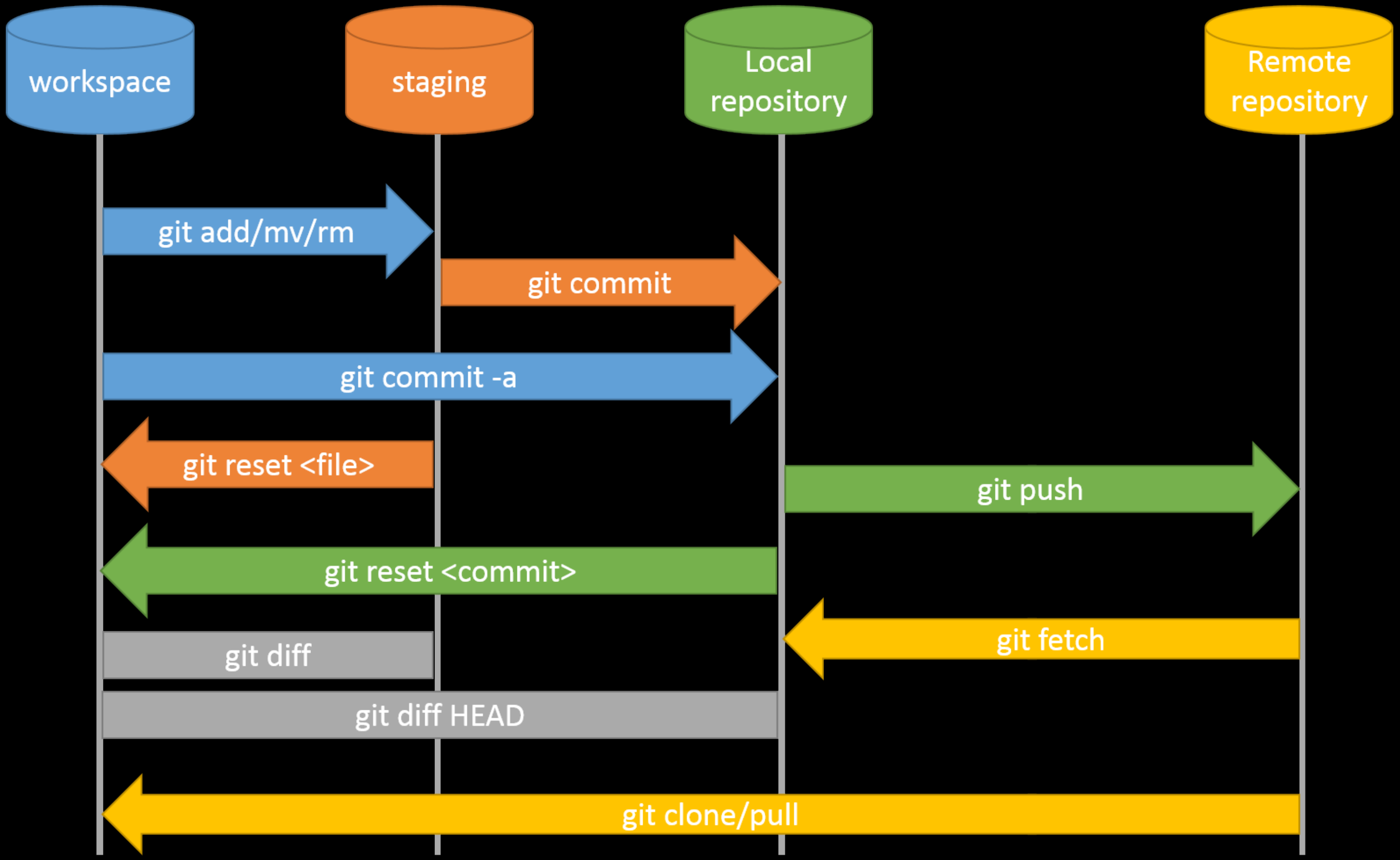
?

Git Workflow – Remote Repo.



What next?

- Branching / Merging
- https://software-carpentry.org