Introduction to Shell-based Data Processing

Lecture 13: GIT (versioning control)
Practice 2: GIT, python plotting, (R)

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Kyoto University, Fall 2024

Video link

- Lecture 2025/01/10: https://youtu.be/Klcf9-HeGXk

Today: git

- GIT
  - Versioning control system initially created for linux kernel.
  - Now widely used, e.g. https://github.com/

Git

64 languages

Article Talk Read Edit View history Tools

From Wikipedia, the free encyclopedia

For other uses, see Git (disambiguation).
Not to be confused with GitHub, GitLab, or Gitea.

Git (/gɪt/)[8] is a distributed version control system[9] that tracks versions of files. It is often used to control source code by programmers who are developing software collaboratively.

Design goals of Git include speed, data integrity, and support for distributed, non-linear workflows — thousands of parallel branches running on different computers.[10][11][12]

As with most other distributed version control systems, and unlike most client–server systems, Git maintains a local copy of the entire repository, also known as

Git

A command-line session showing repository

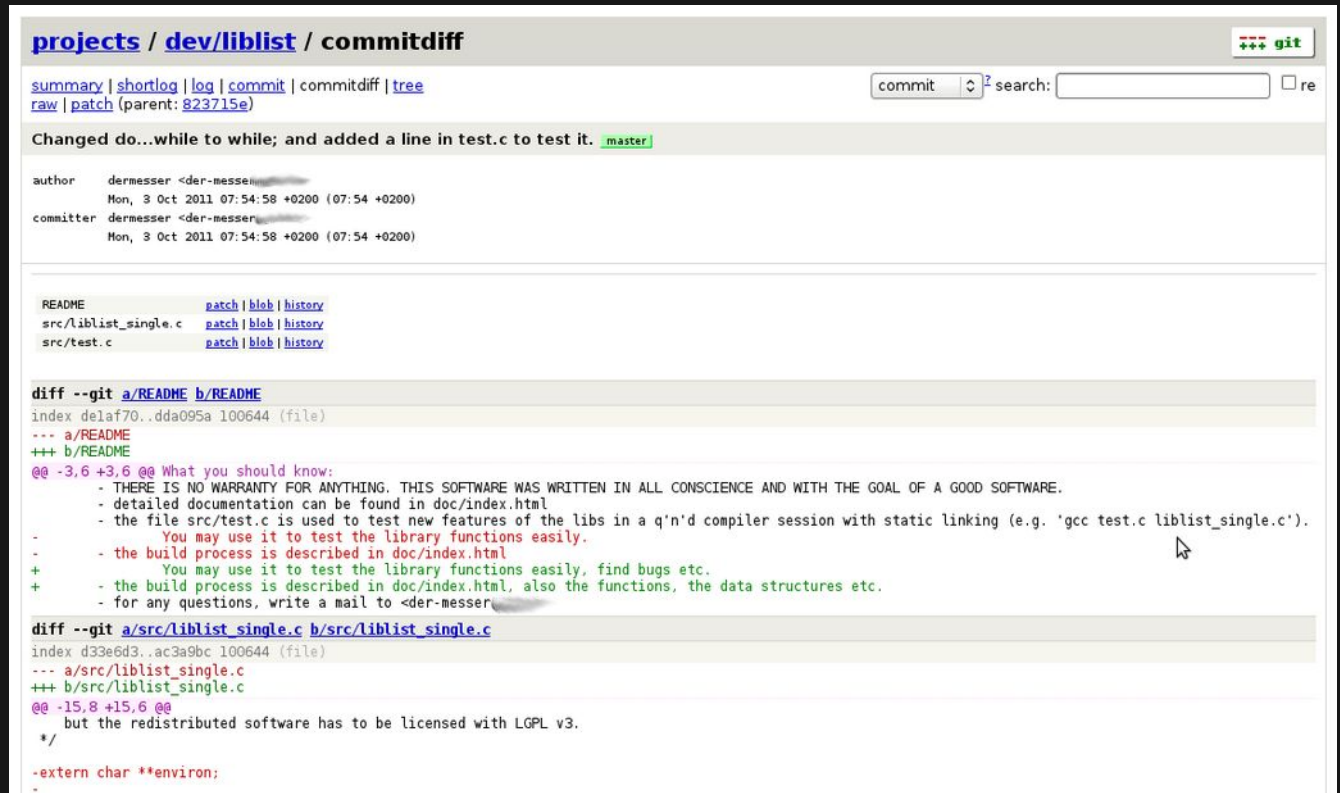
Other versioning systems

- CVS (old!)
- SVN (subversion) – commonly used
- mercurial (newer)

GIT tracks directories/files

- When you make changes and *commit* them, they will be saved as a **version**.
- You can go back to old versions.
- You can merge versions (by same or different people)

This shows the difference between two versions of the files, at time of commit.



Simple git

- 1) Create a new repository and add your files
  - git init .
  - git add FILE1 FILE2 DIR1 *or* git commit *
  - git commit FILE1 FILE2 DIR1 *or* git commit -a
- 2) .gitignore tells which files to ignore (not track)
- 3) Git "information" is stored in hidden ".git" directory at root of repository.
- 4) "Check out" (clone) from *remote* URLs
  - git clone URL
- 5) "pull" to update (git pull) from remote

Create a new git repo 1

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ tree -a
.

0 directories, 0 files
```

Create a new git repo 2

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git init .
hint: Using 'master' as the name for the initial branch. This default br
nch name
hint: is subject to change. To configure the initial branch name to use
n all
hint: of your new repositories, which will suppress this warning, call:
hint:
hint:   git config --global init.defaultBranch <name>
hint:
hint: Names commonly chosen instead of 'master' are 'main', 'trunk' and
hint: 'development'. The just-created branch can be renamed via this com
and:
hint:
hint:   git branch -m <name>
```

Some warnings about naming the branches...

Create a new git repo 3

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ tree -a
.
└── .git
    ├── branches
    ├── config
    ├── description
    ├── HEAD
    ├── hooks
    │   ├── applypatch-msg.sample
    │   ├── commit-msg.sample
    │   ├── fsmonitor-watchman.sample
```

It created hidden .git folder with lots of stuff in it.

Create a new git repo 4

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git status
On branch master

No commits yet

nothing to commit (create/copy files and use "git add" to track)
```

We're not tracking anything yet though!

```
m:~/dataproc2024/labs/13git$ emacs myfile.py
```

```
import sys

for a in range(10):
    print(a);

    pass;

exit(0)
```

```
-UUU:---   F1   myfile.py        All    L8
```

Create a new git repo 5

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git add myfile.py
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git status
On branch master

No commits yet

Changes to be committed:
  (use "git rm --cached <file>..." to unstage)
        new file:   myfile.py
```

We "added" the file, but nothing committed yet...

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git log
fatal: your current branch 'master' does not have any commits yet
```

Create new git repo 6

- Try to commit (oh, we have not configured our "git identity" yet)

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git commit myfile.py
Author identity unknown

*** Please tell me who you are.

Run

  git config --global user.email "you@example.com"
  git config --global user.name "Your Name"
```

Configure git identity...

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git config --global u
ser.email "richard.e.veale@gmail.com"
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git config --global u
ser.name "Richard Veale"
```

git commit (type in "commit message")

```
  /home/riveale99/dataproc2024/labs/13git/.git/COMMIT_EDITMSG *
Added new python file to print numbers 1-10
# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch master
#
# Initial commit
#
# Changes to be committed:
#       new file:   myfile.py
#


Save modified buffer?
 Y Yes
 N No            ^C Cancel
```

Commit the file

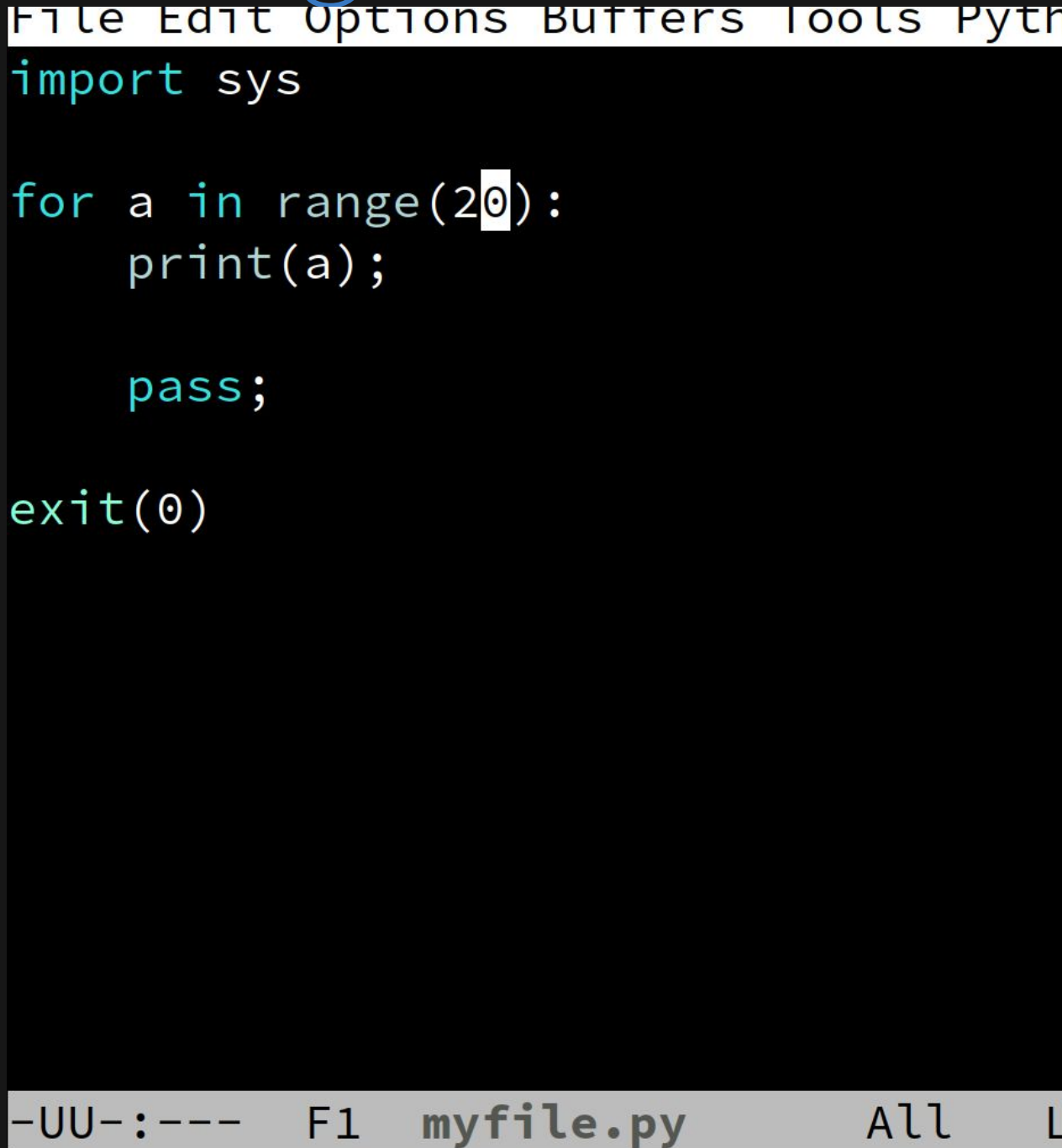
```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git commit myfile.py
[master (root-commit) 5ee900a] Added new file to print numbers 1-10
 1 file changed, 8 insertions(+)
 create mode 100644 myfile.py
```

See the log

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git commit myfile.py
[master (root-commit) 5ee900a] Added new file to print numbers 1-10
 1 file changed, 8 insertions(+)
 create mode 100644 myfile.py
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git status
On branch master
nothing to commit, working tree clean
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git log
commit 5ee900aa4c1c9ae4a48b0432e9ebee0478ae9ab5 (HEAD -> master)
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:13:41 2025 +0000

    Added new file to print numbers 1-10
```

Change something…

- Print 0-19 instead…



Commit changes

- git commit -a (or git commit FILENAME)

```
  /home/riveale99/dataproc2024/labs/13git/.git/COMMIT_EDITMSG *
REV: changed to print 0-19
# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
#
# On branch master
# Changes to be committed:
#       modified:   myfile.py
#


^G Help      ^O Write Out  ^W Where Is  ^K Cut       ^T Execute
^X Exit      ^R Read File  ^\ Replace   ^U Paste     ^J Justify
```

See history of revisions...

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git log
commit 487b225d5c4064e777b0d1237d098bbd8bf372d8 (HEAD -> master)
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:15:47 2025 +0000

    REV: changed to print 0-19

commit 5ee900aa4c1c9ae4a48b0432e9ebee0478ae9ab5
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:13:41 2025 +0000

    Added new file to print numbers 1-10
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$
```

Oops, we want to go back!

- git checkout <ID>
  - IDs are the commit hashes

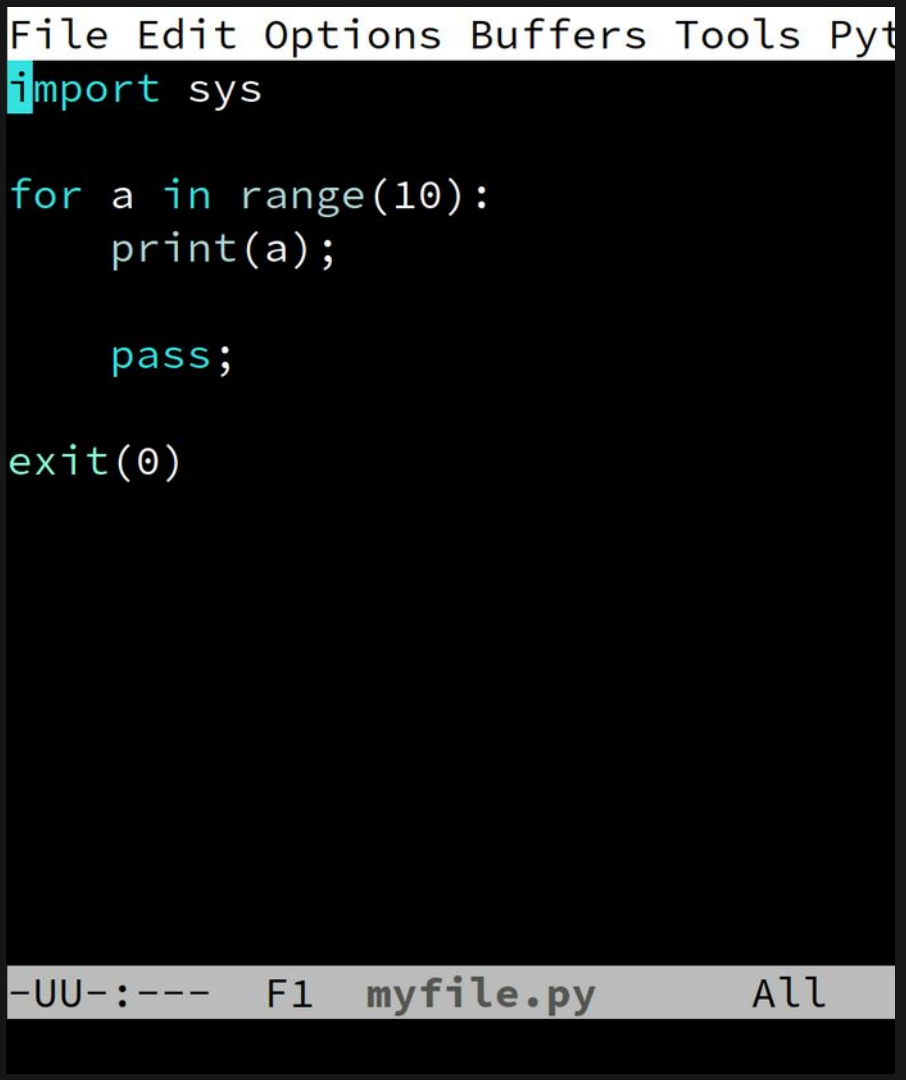
```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git log
commit 487b225d5c4064e777b0d1237d098bbd8bf372d8 (HEAD -> master)
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:15:47 2025 +0000

    REV: changed to print 0-19

commit 5ee900aa4c1c9ae4a48b0432e9ebee0478ae9ab5
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:13:41 2025 +0000

    Added new file to print numbers 1-10
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$
```

Git reverting

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git checkout 5ee900aa
4c1c9ae4a48b0432e9ebee0478ae9ab5 .
Updated 1 path from 3c95963
```

Note the DOT!

- Our file is back to how it was before!



Check in with the old code...

- The -m replaces opening an editor (faster sometimes)

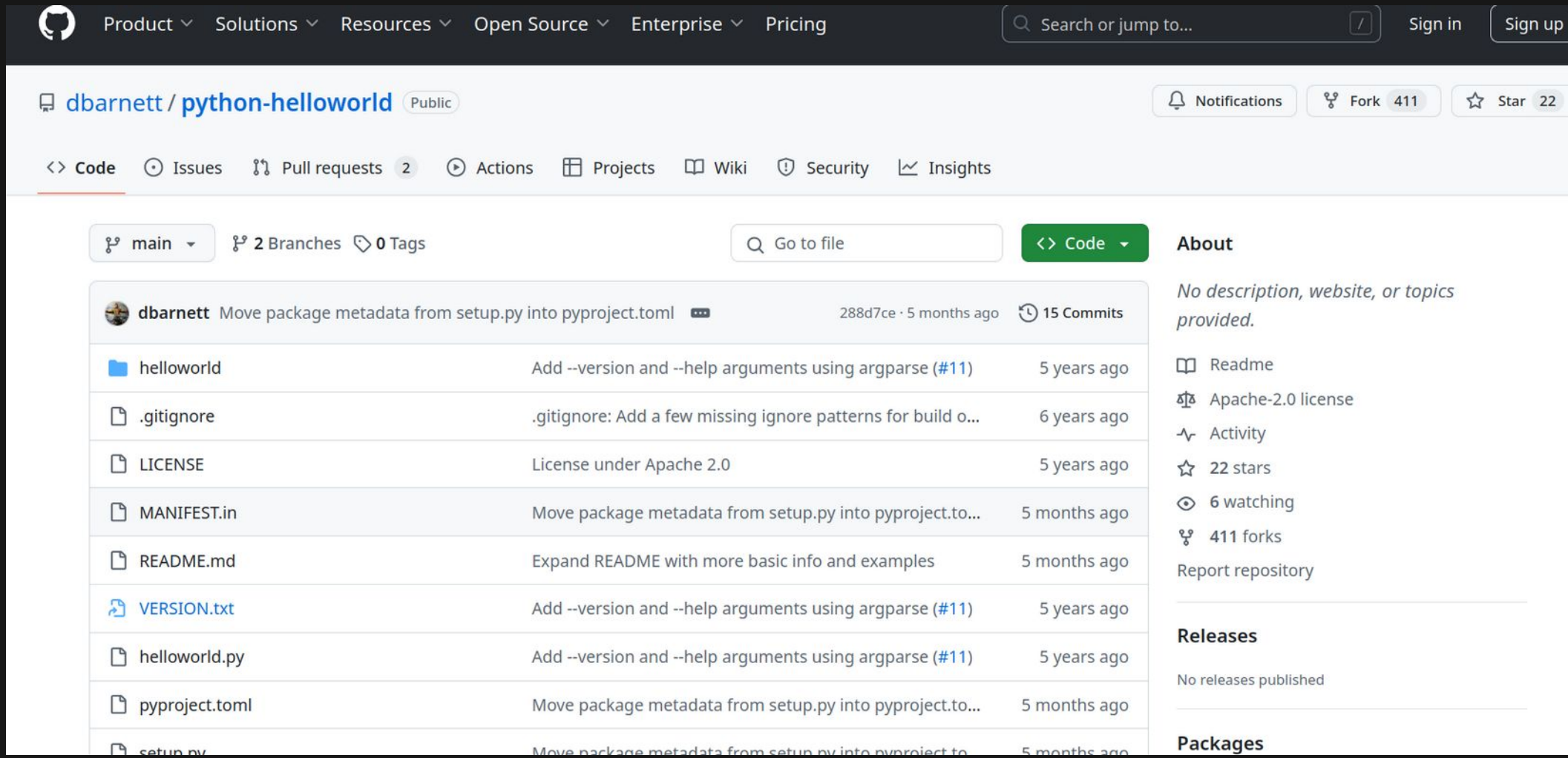
```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git commit -m "Restor
ing old source code"
[master e6200a9] Restoring old source code
 1 file changed, 1 insertion(+), 1 deletion(-)
```

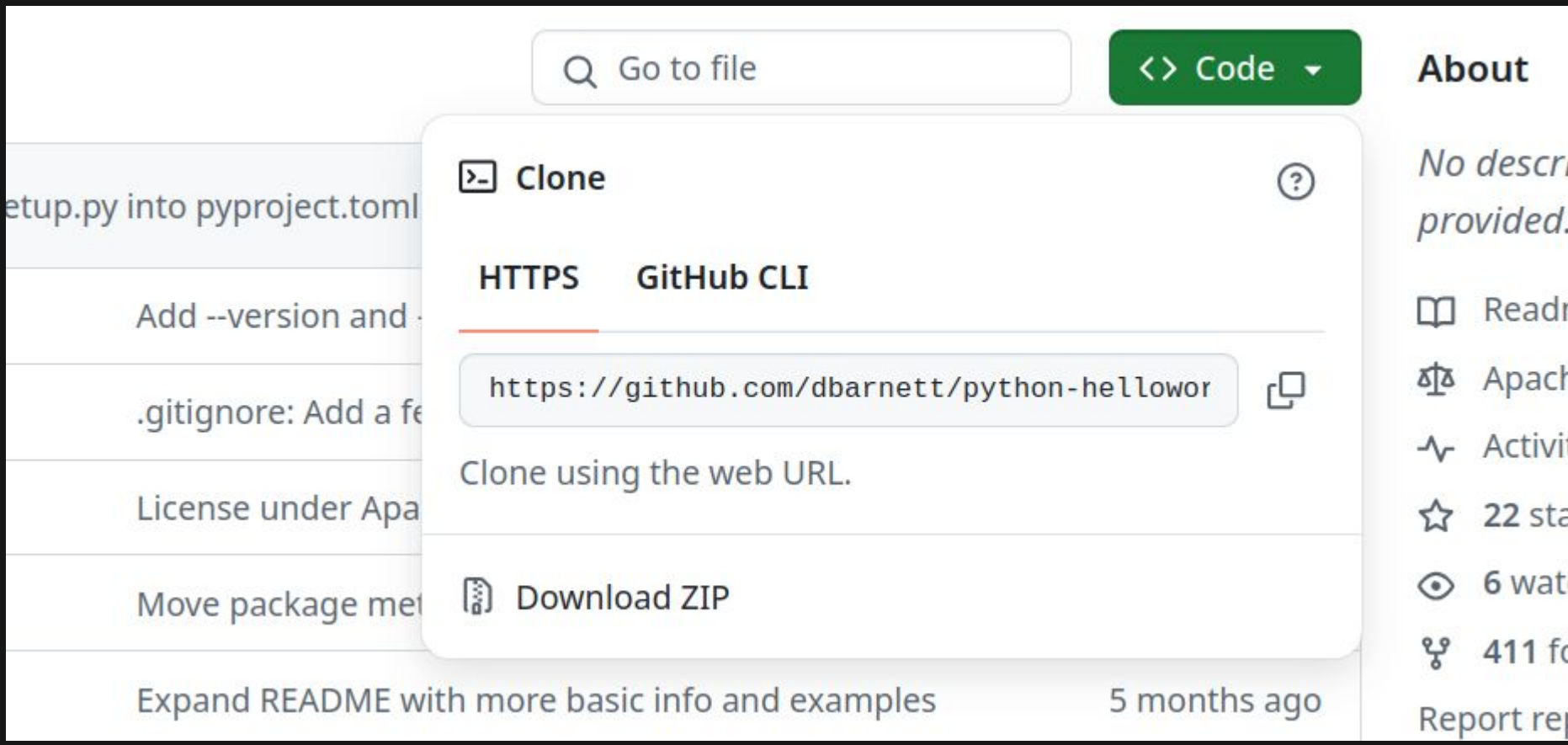
Now we're back.

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git log
commit e6200a97003ee89f6dbb4e92043bdb9b185b9985 (HEAD -> master)
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:20:36 2025 +0000

    Restoring old source code

commit 487b225d5c4064e777b0d1237d098bbd8bf372d8
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:15:47 2025 +0000

    REV: changed to print 0-19

commit 5ee900aa4c1c9ae4a48b0432e9ebee0478ae9ab5
Author: Richard Veale <richard.e.veale@gmail.com>
Date:   Fri Jan 10 04:13:41 2025 +0000

    Added new file to print numbers 1-10
```

Cloing remote repositories

- Repositories can be available via SSH or HTTPS




Go to file
Code
About
Clone
HTTPS
GitHub CLI
https://github.com/dbarnett/python-hellowor
Clone using the web URL.
Download ZIP
etup.py into pyproject.toml
Add --version and
.gitignore: Add a fe
License under Apa
Move package met
Expand README with more basic info and examples
5 months ago
No descrip
provided.
Readm
Apach
Activity
22 star
6 watc
411 fo
Report rep

Remote repo

- git clone [URL]

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git$ git clone https://gi
hub.com/dbarnett/python-helloworld.git
Cloning into 'python-helloworld'...
remote: Enumerating objects: 59, done.
remote: Counting objects: 100% (22/22), done.
remote: Compressing objects: 100% (14/14), done.
remote: Total 59 (delta 14), reused 8 (delta 8), pack-reused 37 (from 1)
Receiving objects: 100% (59/59), 13.96 KiB | 6.98 MiB/s, done.
Resolving deltas: 100% (20/20), done.
```

Then you can modify it...

```
riveale99@dataproc2023vm:~/dataproc2024/labs/13git/python-helloworld$ ls
helloworld      LICENSE       pyproject.toml  setup.py
helloworld.py   MANIFEST.in   README.md       VERSION.txt
riveale99@dataproc2023vm:~/dataproc2024/labs/13git/python-helloworld$ git
 log
commit 288d7ced1b971fd1b3b0c36002b96e1c3f91542e (HEAD -> main, origin/mai
n, origin/HEAD)
Author: David Barnett <david@mumind.me>
Date:   Fri Aug 16 17:45:24 2024 -0600

    Move package metadata from setup.py into pyproject.toml

    Details on pyproject.toml: PEP 621.

commit aed348ececb1860aa32e12ca9767b02e6dce8d21
Author: David Barnett <david@mumind.me>
Date:   Fri Aug 16 17:57:57 2024 -0600

    setup.py: genericize author name/email (to avoid copypasta of actual
```

Git LAB (13)

- Create a new folder /home/USER/dataproc2024/labs/13git
- Make it into a git repository.
- Write a python script to print numbers 0-9.
- Check it in.
- Change the script to print numbers 0-19.
- Check it in.
- Revert to the first version.
- Check in the (reverted) first version.
- Paste your git LOG into PANDAS as submission.