Git Tutorial

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OCNC 2019

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Setting up Git

- Here we are mostly following "Version Control with Git" at https://swcarpentry.github.io/git-novice

- If you use git for the first time, set up git with your name and email address:

```
git config --global user.name "Here Your Name"

git config --global user.email "your.name@awesome.univ"
```

Creating a project

- To make a repo:

```
mkdir my_project; cd my_project
```

```
git init
```

```
git status
```

```
gitk
```

Adding files to a project

- Let's create a text file and add it to a repo:

```
echo "Hello, there" > file1.txt

git status  # check status

git add file1.txt

git status  # check status

git commit -m "file1.txt"
```

Adding files to a project

- Let's create a text file and add it to a repo (cont'd):

```
git commit -m "file1.txt" # ⟵ That was a bad message

git commit --amend -m "Add a file saying hello”

git log # (or gitk)
```

git log

```
ocnc@ocnc-VirtualBox:~/Documents/my_project$ git log
commit 6744f88472d01203ba01047c8a250cc0b2e6fb50 (HEAD -> master)
Author: Sungho Hong <shhong@oist.jp>
Date:   Tue Jun 25 10:37:26 2019 +0900

    Add the first file saying hello
```

- **SHA1** (6744f88472…) is an id of this commit and is useful if you need to access this commit.
  - In most cases, you don’t need to type it all but only the beginning part.
  -

Exercise

- Add more files and create longer history.

Committing modified files

- Let's modify an existing file:

```
echo “And good afternoon and good night” >> file1.txt
```

```
git status
```

```
git diff
```

Committing modified files

- Let's modify an existing file and commit it:

```
git add files1.txt

git commit -m “Add more greetings in file1.txt”

git log # (or gitk)
```

Reviewing changes

- Let's modify an existing file and commit it:

`git log`

```
commit 4ef8f1f5670c65c78f6593b6018a0d67208b2a13 (HEAD -> master)
Author: Sungho Hong <shhong@oist.jp>
Date:   Tue Jun 25 10:59:10 2019 +0900

    Add more greetings in file1.txt

commit 6744f88472d01203ba01047c8a250cc0b2e6fb50
Author: Sungho Hong <shhong@oist.jp>
Date:   Tue Jun 25 10:37:26 2019 +0900

    Add the first file saying hello
```

```
git show 6744:file1.txt # or git show 6744:file1.txt > file1_6744.txt
```

```
git diff 6744 file1.txt
```

Going back in time and coming back

```
git checkout 6744
```

```
git checkout master
```

Cloning a repo

```
cd ..

git clone my_project joe_project

cd joe_project

git status

git log
```

git log

```
commit 4ef8f1f5670c65c78f6593b6018a0d67208b2a13 (HEAD -> master, origin/master, origin/HEAD)
Author: Sungho Hong <shhong@oist.jp>
Date:   Tue Jun 25 10:59:10 2019 +0900

    Add more greetings in file1.txt

commit 6744f88472d01203ba01047c8a250cc0b2e6fb50
Author: Sungho Hong <shhong@oist.jp>
Date:   Tue Jun 25 10:37:26 2019 +0900

    Add the first file saying hello
```

git remote show origin

Pulling changes from a remote repo

- Let’s go back to “origin” and make and commit changes:

```
cd ../my_project
```

- … (making a change and commit it) …

```
echo “Tutorial status: Going well” > status.txt

git add status.txt; git commit -m “Add a file for
recording status”

git log
```

Pulling changes from a remote repo

- Let’s go to the cloned repo and pull changes:

```
cd ../joe_project
```

```
git pull origin master
```

Inspecting changes before pulling them

- If you want to be more careful and avoid pulling changes immediately:

```
git fetch origin master

git diff origin/master

git merge origin/master # or again, git pull origin master
```

Conflicts

- Let’s change and commit status.txt in both places:

```
cd ../my_project

echo “Tutorial Status: Another Error Occured” > status.txt

git add .; git commit -m “Update the status”
```

```
cd ../joe_project

echo “Tutorial Status: Going Well” > status.txt

git add .; git commit -m “Update the status”
```

git pull origin master

```
ocnc@ocnc-VirtualBox:~/Documents/my_project2$ git pull origin master
From /home/ocnc/Documents/my_project
 * branch            master     -> FETCH_HEAD
Auto-merging status.txt
CONFLICT (content): Merge conflict in status.txt
Automatic merge failed; fix conflicts and then commit the result.
```

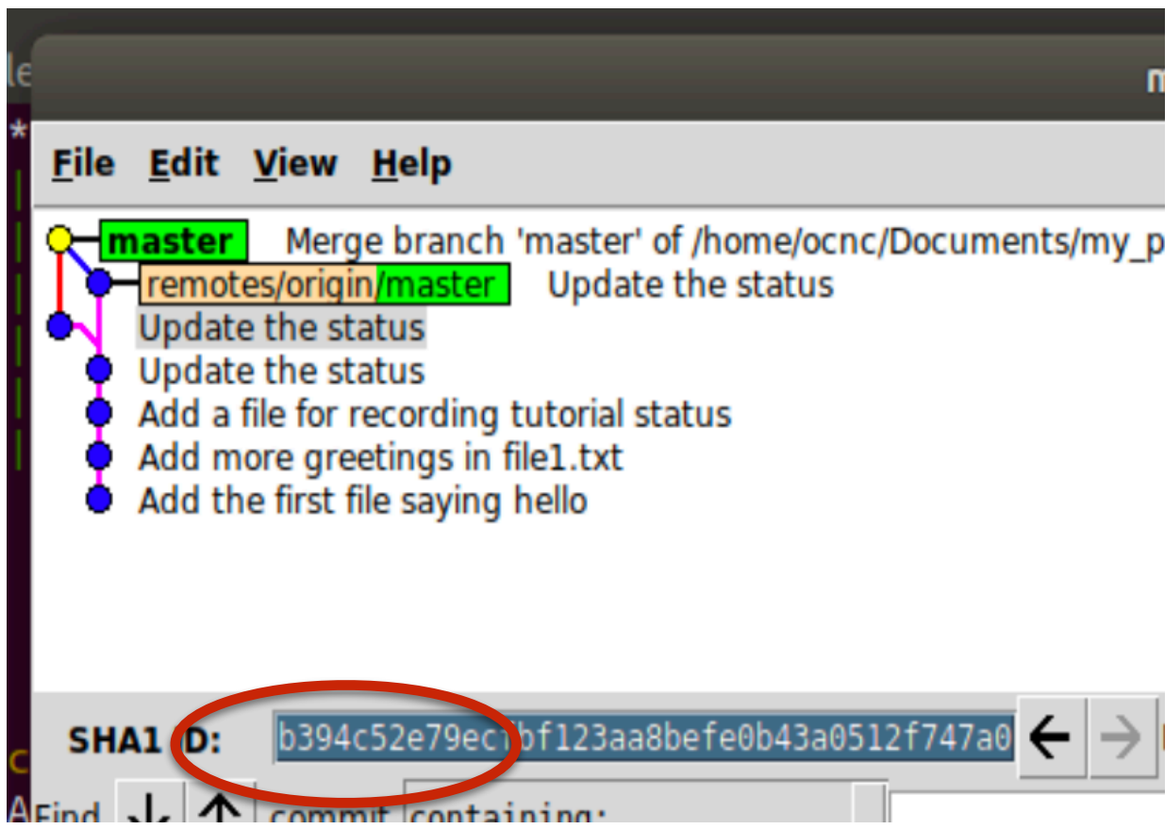
Resolving conflitcs #1: Choose ours over theirs

```
git merge --abort

git pull origin master -X ours

# …Editing the commit message…

git log

more status.txt
```

HARD RESET!

- Now you don’t like what you just did and want to *reset to a previous commit*:

```
gitk # or git log --graph
```




```
git reset --hard b394

more status.txt

git log
```

Resolving conflitcs #2: Choose theirs over ours

```
git pull origin master -X theirs

# …Editing the commit message…

git log

more status.txt
```

Resolving conflitcs #3: Editing conflicts

```
git reset --hard b394

# … Editing the conflicted file …

git status

git add status.txt

git merge --continue
```

Pushing your changes to a remote

- If a remote repo is where you are *allowed* to push your changes, you can update the remote:

```
git push origin master
```

Cloning a repo from github

`git clone http://github.com/shhong/ocnc2019_git_tutorial`

github way of contributing to a project

- “Fork” the project repo.
- Clone your fork and work on it, which you can push to your fork.
- Send a “pull request” to ask meging of your work into their repo.

Important topics omitted

- GUIs
  - Sourcetree, GitKraken,…; Visual Studio Code, Atom,…
- Branching and merging: “git branch” (https://learngitbranching.js.org)
  - Rebasing: “git rebase”
- git blame
- Large binary data
- More on using github

Questions?