Introduction to Git

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12/12/2019, WHG

Outline

Introduction - what is version control? What is Git?

Few basic concepts

Introduction of main commands

Demo

Practical! :)

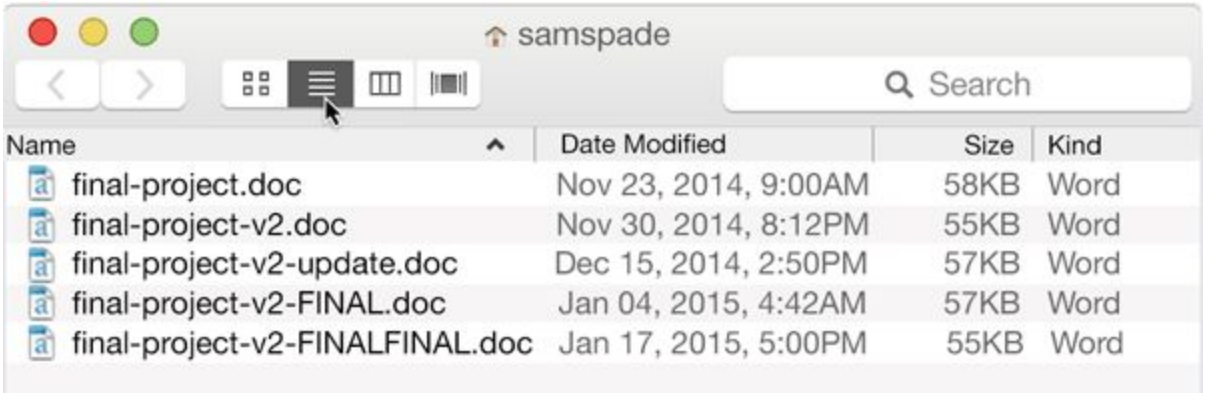
What is version control?

version control (aka revision control or source control) is the management of changes to documents, computer programs, large web sites, and other collections of information. [...] Each revision is associated with a **timestamp** and the **person making the change**.

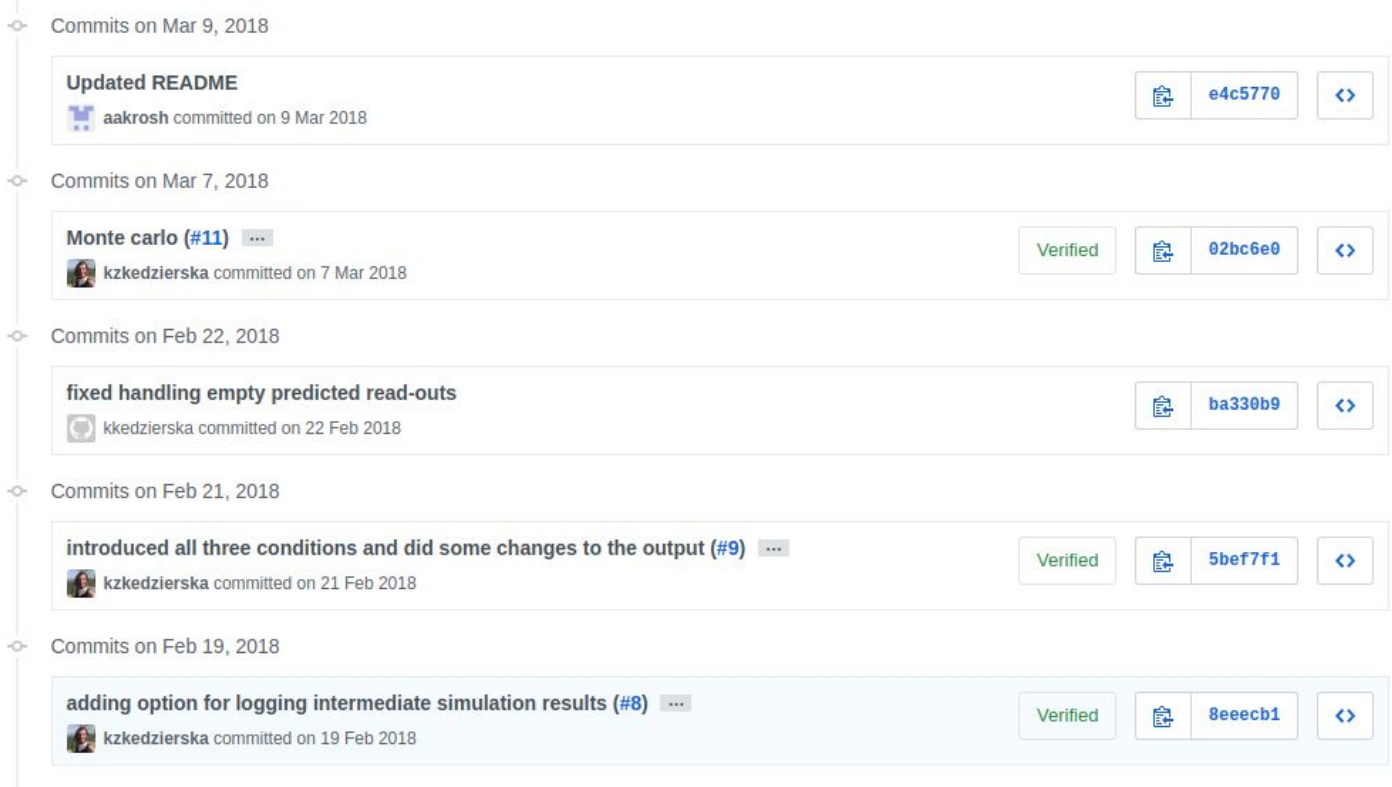
Revisions can be compared, **restored**, and with some types of files, merged.

Source: Wikipedia, accessed: 12/12/2019

Why version Control?



Why version control?



What's git then?

Git was created by Linus Torvalds in 2005 for development of the Linux kernel.

It's a software that keeps

GitClient - two main players

GitHub: https://github.com/

Bitbucket: https://bitbucket.org/product

Biggest differences:

- no limit on file size in Bitbucket (?)
- unlimited private repos on GitHub

Git is hard?


THIS IS GIT. IT TRACKS COLLABORATIVE WORK ON PROJECTS THROUGH A BEAUTIFUL DISTRIBUTED GRAPH THEORY TREE MODEL.
COOL. HOW DO WE USE IT?
NO IDEA. JUST MEMORIZE THESE SHELL COMMANDS AND TYPE THEM TO SYNC UP. IF YOU GET ERRORS, SAVE YOUR WORK ELSEWHERE, DELETE THE PROJECT, AND DOWNLOAD A FRESH COPY.

Git Init

This is what we start with. The command that will create a new repository.

```
 11:28:49  carbon-tower in ~/github
○→git init demo_repo
Initialised empty Git repository in /home/kzkedzierska/github/demo_repo/.git/

 11:28:57  carbon-tower in ~/github
○→ll demo_repo/
total 12K
drwxr-xr-x  3 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ./
drwxr-xr-x 14 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ../
drwxr-xr-x  7 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 .git/

 11:29:06  carbon-tower in ~/github
○→ll demo_repo/.git/
total 40K
drwxr-xr-x 7 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ./
drwxr-xr-x 3 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ../
drwxr-xr-x 2 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 branches/
-rw-r--r-- 1 kzkedzierska kzkedzierska   92 Dec 12 11:28 config
-rw-r--r-- 1 kzkedzierska kzkedzierska   73 Dec 12 11:28 description
-rw-r--r-- 1 kzkedzierska kzkedzierska   23 Dec 12 11:28 HEAD
drwxr-xr-x 2 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 hooks/
drwxr-xr-x 2 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 info/
drwxr-xr-x 4 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 objects/
drwxr-xr-x 4 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 refs/
```

Git INIT

```
 11:50:15  carbon-tower in ~/github/demo_repo
± |master ✓| →touch this_file.txt

 11:50:28  carbon-tower in ~/github/demo_repo
± |master ?:1 ✗| →touch this_other_file.txt

 11:50:35  carbon-tower in ~/github/demo_repo
± |master ?:2 ✗| →ll
total 12K
drwxr-xr-x  3 kzkedzierska kzkedzierska 4.0K Dec 12 11:50 ./
drwxr-xr-x 14 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ../
drwxr-xr-x  7 kzkedzierska kzkedzierska 4.0K Dec 12 11:50 .git/
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:50 this_file.txt
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:50 this_other_file.txt
```

Git clone

git clone <url_of_the_repository> # this allows you to clone a repository from a remote source, for example GitHub

Git add

This command actually adds the files to the list of tracked files.

git add this_file.txt

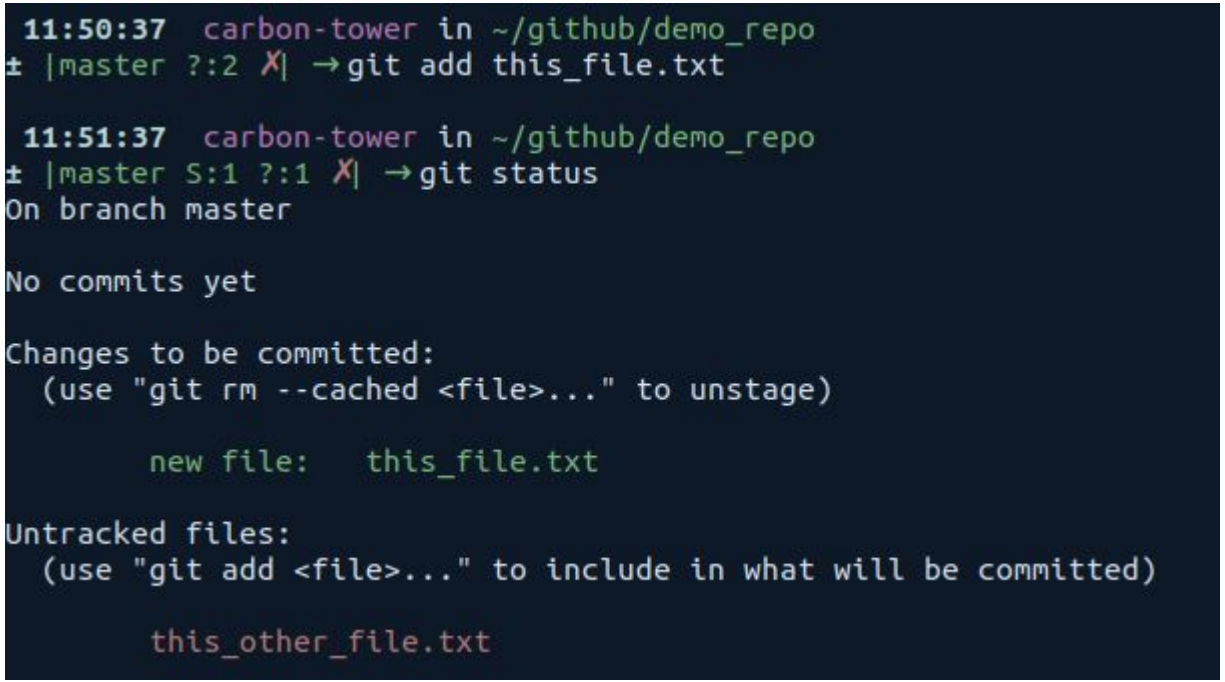
git add . # this will add all files in the directory

git status # this will show you the status of your repository

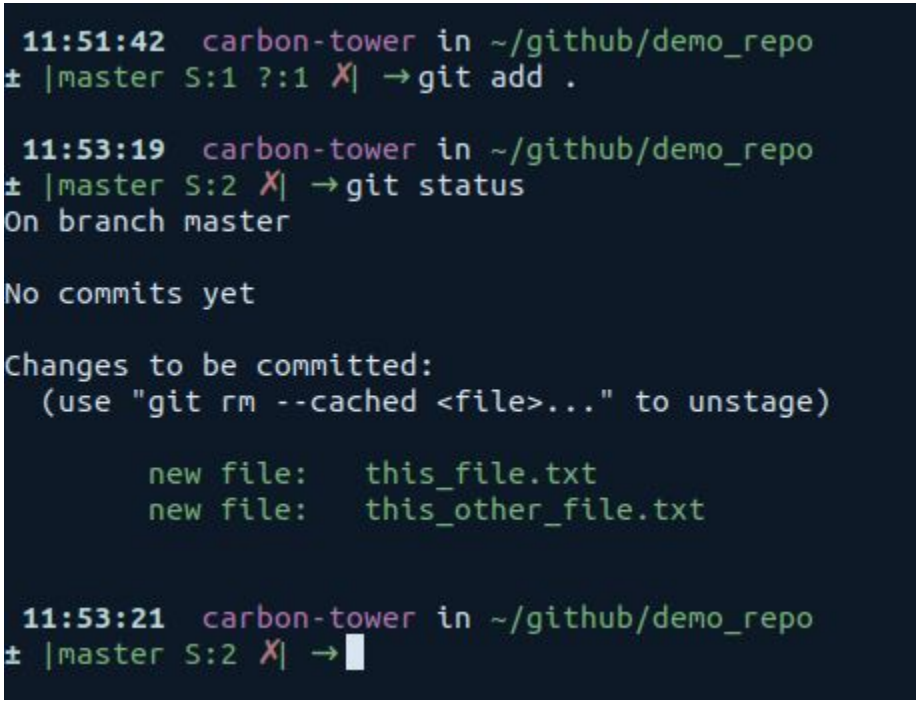
git rm this_file.txt # this will delete the file

git rm --cached this_file.txt # this will delete it from the list of tracked files

Git ADD


11:50:37 carbon-tower in ~/github/demo_repo
± |master ?:2 ✗| →git add this_file.txt
11:51:37 carbon-tower in ~/github/demo_repo
± |master S:1 ?:1 ✗| →git status
On branch master
No commits yet
Changes to be committed:
(use "git rm --cached <file>..." to unstage)
new file: this_file.txt
Untracked files:
(use "git add <file>..." to include in what will be committed)
this_other_file.txt

Git ADD


11:51:42 carbon-tower in ~/github/demo_repo
± |master S:1 ?:1 ✗| →git add .
11:53:19 carbon-tower in ~/github/demo_repo
± |master S:2 ✗| →git status
On branch master
No commits yet
Changes to be committed:
(use "git rm --cached <file>..." to unstage)
new file: this_file.txt
new file: this_other_file.txt
11:53:21 carbon-tower in ~/github/demo_repo
± |master S:2 ✗| →

Git Commit

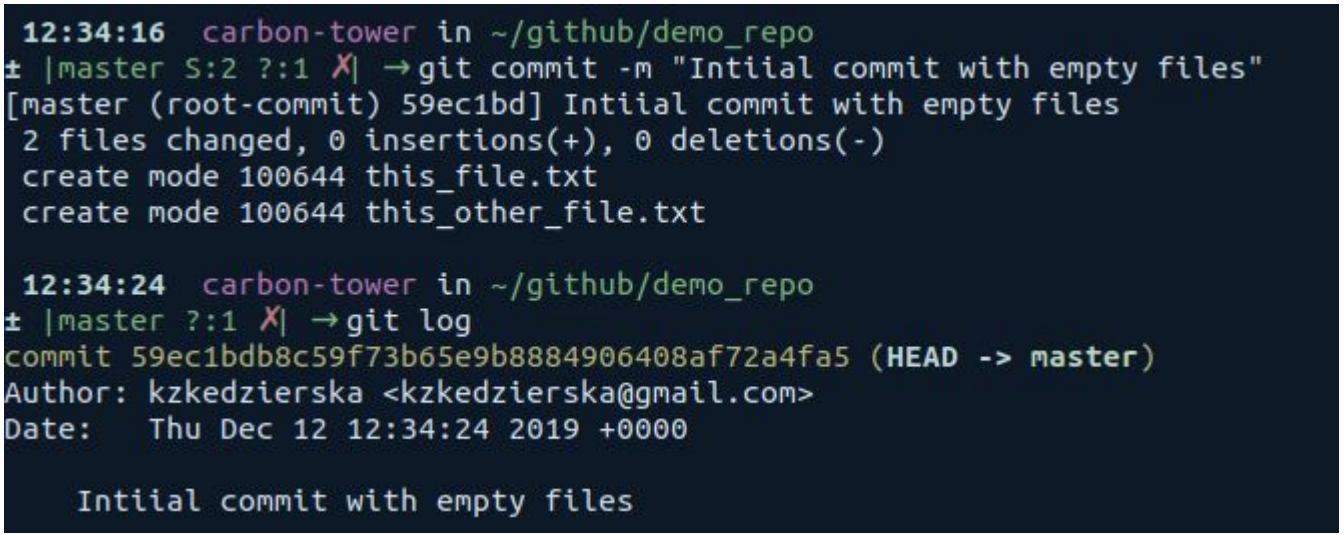
git commit -m “Descriptive message”

git commit -a / -all -m “Descriptive message” # this will automatically stage files that have been modified and deleted, but new files you have not told Git about are not affected.

git status # this will show you the status of your repository

git log # this will tell you about the commits and history of the repository

Git COMMIT


12:34:16 carbon-tower in ~/github/demo_repo
± |master S:2 ?:1 ✗| →git commit -m "Intiial commit with empty files"
[master (root-commit) 59ec1bd] Intiial commit with empty files
2 files changed, 0 insertions(+), 0 deletions(-)
create mode 100644 this_file.txt
create mode 100644 this_other_file.txt
12:34:24 carbon-tower in ~/github/demo_repo
± |master ?:1 ✗| →git log
commit 59ec1bdb8c59f73b65e9b8884906408af72a4fa5 (HEAD -> master)
Author: kzkedzierska <kzkedzierska@gmail.com>
Date: Thu Dec 12 12:34:24 2019 +0000
Intiial commit with empty files

.GitIgnore

This is a file in which we can store a list of files we don’t want to be tracked.

Why would we do it? Exclude the data files (GitHub limits: 100 MB), private config files etc.

.GITIGNORE

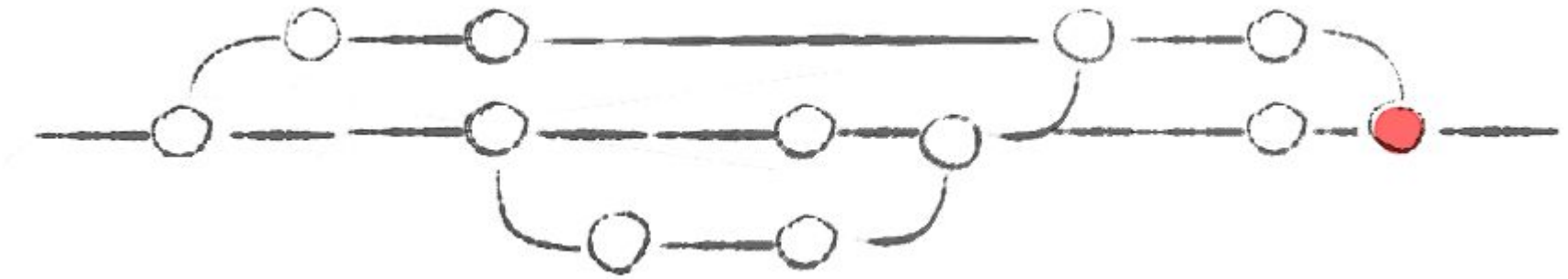
```
 12:34:41  carbon-tower in ~/github/demo_repo
± |master ?:1 ✗| →ll
total 20K
drwxr-xr-x  4 kzkedzierska kzkedzierska 4.0K Dec 12 12:33 ./
drwxr-xr-x 14 kzkedzierska kzkedzierska 4.0K Dec 12 11:28 ../
drwxr-xr-x  2 kzkedzierska kzkedzierska 4.0K Dec 12 11:54 empty_dir/
drwxr-xr-x  8 kzkedzierska kzkedzierska 4.0K Dec 12 12:34 .git/
-rw-r--r--  1 kzkedzierska kzkedzierska   24 Dec 12 11:54 .gitignore
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:54 nope1.txt
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:54 nope2.txt
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:53 not_this_file.txt
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:50 this_file.txt
-rw-r--r--  1 kzkedzierska kzkedzierska    0 Dec 12 11:50 this_other_file.txt

 12:35:23  carbon-tower in ~/github/demo_repo
± |master ?:1 ✗| →head .gitignore
not_this_file.txt
nope*

 12:35:29  carbon-tower in ~/github/demo_repo
± |master ?:1 ✗| →git add .

 12:35:33  carbon-tower in ~/github/demo_repo
± |master S:1 ✗| →git status
On branch master
Changes to be committed:
  (use "git reset HEAD <file>..." to unstage)

        new file:   .gitignore
```

History of COMMITS

```
 12:35:38  carbon-tower in ~/github/demo_repo
± |master S:1 ✗| →git commit -m "Added .gitignore"
[master c5a05a4] Added .gitignore
 1 file changed, 2 insertions(+)
 create mode 100644 .gitignore

 12:35:55  carbon-tower in ~/github/demo_repo
± |master ✓| →git log
commit c5a05a4821916e16f0365d91bf6a233672416d68 (HEAD -> master)
Author: kzkedzierska <kzkedzierska@gmail.com>
Date:   Thu Dec 12 12:35:55 2019 +0000

    Added .gitignore

commit 59ec1bdb8c59f73b65e9b8884906408af72a4fa5
Author: kzkedzierska <kzkedzierska@gmail.com>
Date:   Thu Dec 12 12:34:24 2019 +0000

    Intiial commit with empty files
```

Branching

Branch early, branch often!



Branching

git branch <branch_name> # create a branch named *branch_name*

git checkout <branch_name> # switch to a branch named *branch_name*

git checkout -b <branch_name> # switch to a NEW branch *branch_name*

git branch -d <branch_name> # this will delete a *branch_name*

git merge <branch_name> # this will merge the *branch_name* with the current branch

DEMO

Let's See that history

Online:
https://github.githistory.xyz/kzkedzierska/intro_to_git/blob/master/README

Let's See that history

Now, try it yourself!

Navigate here:

https://learngitbranching.js.org/

Thanks!

Big shout out to Duncan Parkes!

Resources:

Official Git tutorial

Visualise Git History

List of Git tutorials

Learn Git Branching

Read about ducks in programming here. :)