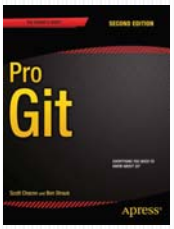
# 01-2 – git – Local Repositories

Much of this is taken from…

**Pro Git**
**professional version control**

https://git-scm.com/book/en/v2




## What is git?

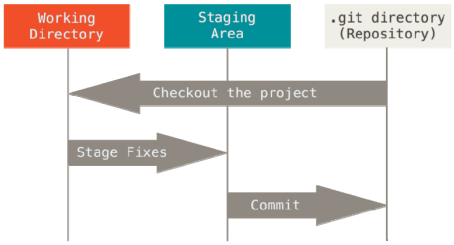
- A distributed revision control system with an emphasis on being fast
- Initially designed and developed by Linus Torvalds for Linux kernel development
- Every Git working directory is
  - a full-fledged repository
  - with complete history and
  - full revision tracking capabilities,
  - not dependent on network access or a central server

## Directory Details

- The Git directory (**`.git`**) is where Git stores the metadata and object database for your project
- This is the most important part of Git
- It is what is copied when you **`clone`** a repository from another computer

## Git workflow

- Modify files in your working directory
- Stage the files, adding snapshots of them to staging area
- Commit, takes the files as they are in the staging area and stores that snapshot permanently to your Git directory




## Configuration Files

- **/etc/gitconfig** : values for every user on the system
- **~/.gitconfig file**: Specific to you.
- **.git/config** : config file for current repository
  - Specific to that single repository
  - Each level overrides values in the previous level

```
$ cat ~/.gitconfig
[user]
      name = Mark A. Yoder
      email = Mark.A.Yoder@Rose-Hulman.edu
[github]
      user = MarkAYoder
      token = a8836c841ce558a8f52af0a7bd1dbe79
```

## .git/config

```
$ cat .git/config
[core]
      repositoryformatversion = 0
      filemode = true
      bare = false
      logallrefupdates = true
[remote "origin"]
      fetch = +refs/heads/*:refs/remotes/origin/*
      url = git@github.com:MarkAYoder/gitLearn.git
[branch "master"]
      remote = origin
      merge = refs/heads/master
```

## Things to configure

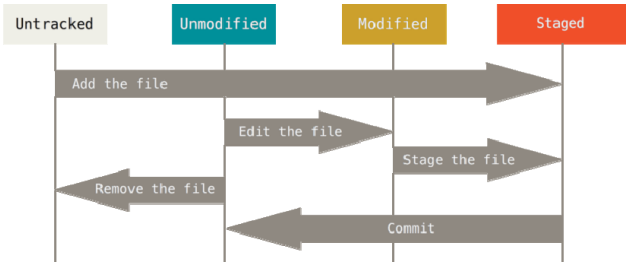
```
$ git config --global user.name "Mark A. Yoder"
$ git config --global user.email Mark.A.Yoder@Rose-Hulman.edu
$ git config --global core.editor vi

$ git config user.name
Mark A. Yoder

$ git help
$ git help config
```

The *git lab* leads you to **github** which will lead you through these commands.

## File Status Lifecycle

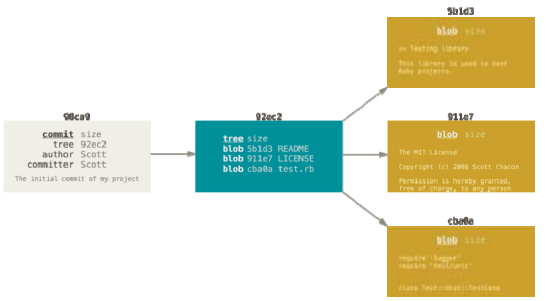
See *git lab* for more details

- See: https://git-scm.com/book/en/v2/Git-Basics-Recording-Changes-to-the-Repository

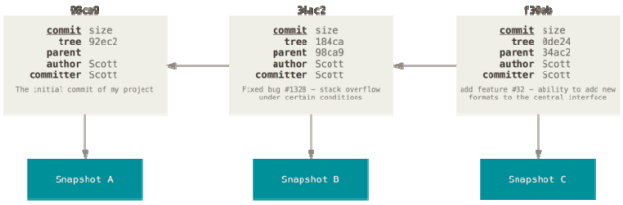



## Branching

```
$ git add README test.rb LICENSE
$ git commit -m "initial commit of my project"
```

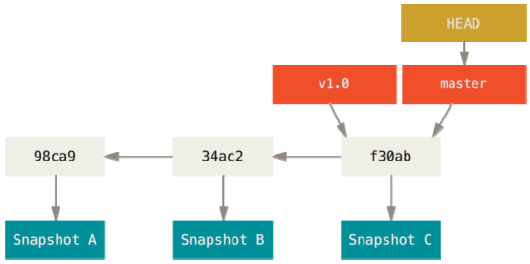



## After 2 more commits



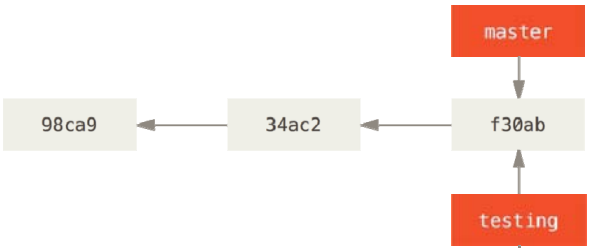

## master

- A branch is a lightweight movable pointer to a commit
- Default: **`master`**




## New branch

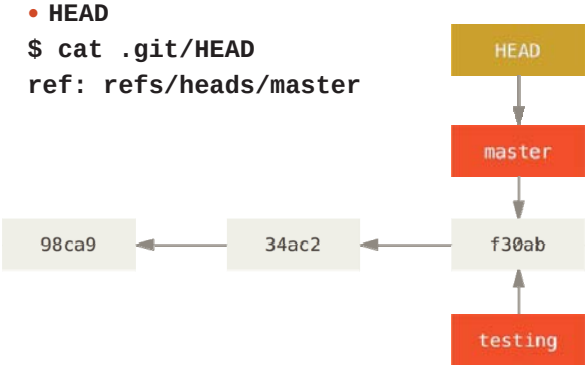
```
$ git branch testing
```



## What's the current branch?

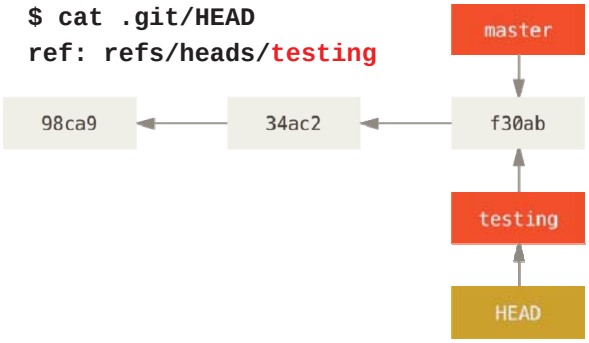
- **HEAD**

```
$ cat .git/HEAD
ref: refs/heads/master
```



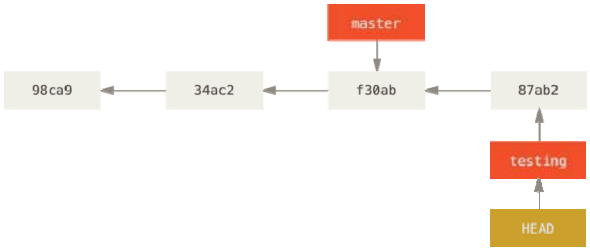

## Switch branches

```
$ git checkout testing
$ cat .git/HEAD
ref: refs/heads/testing
```



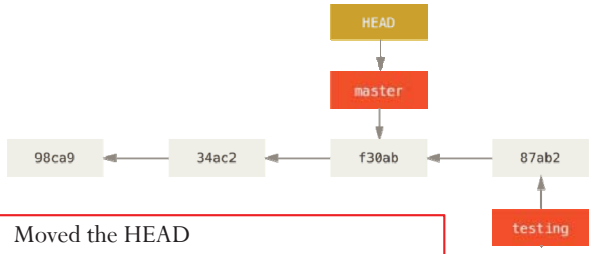

## Another commit

```
$ vi test.rb
$ git add test.rb
$ git commit -m 'made a change'
```




## What does this do?

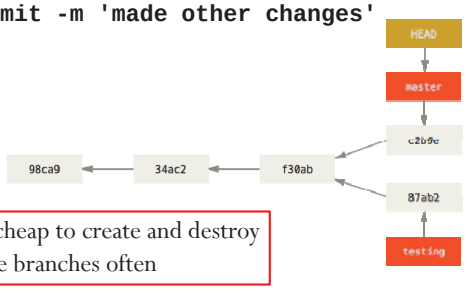
```
$ git checkout master
```




- Moved the HEAD
- Reverted the files in your working directory back to the snapshot that master points to.

## More changes

```
$ vi test.rb
$ git add test.rb
$ git commit -m 'made other changes'
```




- Branches are cheap to create and destroy
- Create and use branches often

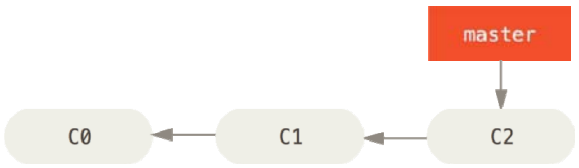
## Merge

- See: https://git-scm.com/book/en/v2/Git-Branching-Basic-Branching-and-Merging for a merge example

You'll do this in the *git lab*

## Basic Branching and Merging

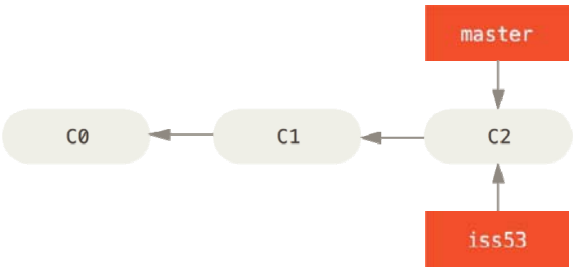
- You are working on a project and have a couple of commits




## Issue #53

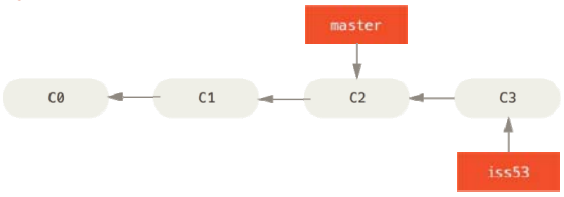
- You get a call and need to work on issue #53

```
$ git checkout -b iss53
Switched to a new branch “iss53”
```




## ... after some work...

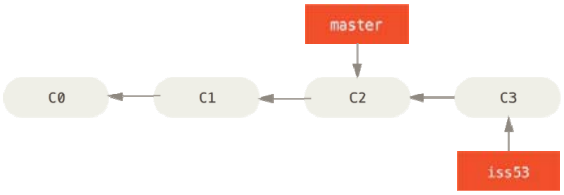
```
$ vim index.html
$ git commit -a -m 'added a new footer
[issue 53]'
```




## Another call...

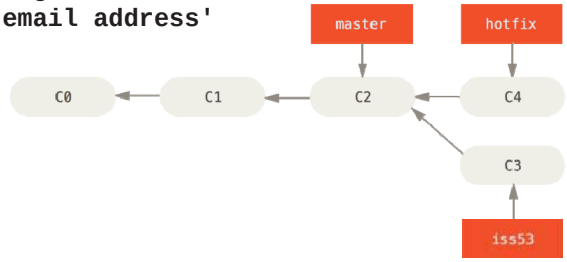
- There’s a problem with the web site and you need to fix it

```
$ git checkout master
Switched to branch "master“
```



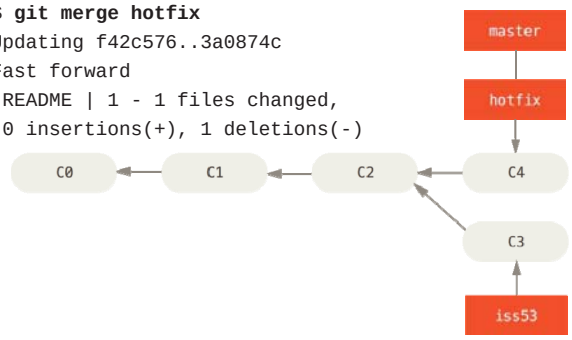

## Work in the web site

```
$ git checkout -b 'hotfix'
Switched to a new branch "hotfix"
$ vim index.html
$ git commit -a -m 'fixed the broken
email address'
```



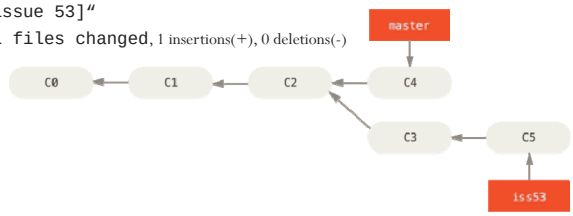

## Run Tests and Merge

```
After testing hotfix, merge it back to master
$ git checkout master
$ git merge hotfix
Updating f42c576..3a0874c
Fast forward
 README | 1 - 1 files changed,
 0 insertions(+), 1 deletions(-)
```



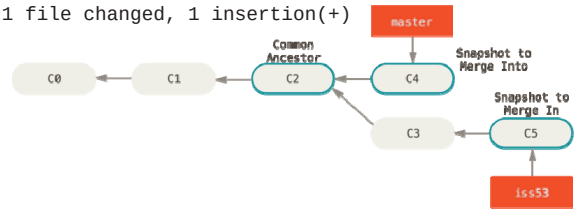
## Back to issue #53

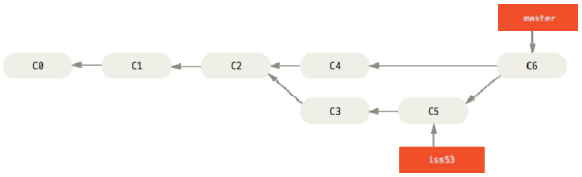
```
$ git branch -d hotfix
Deleted branch hotfix (3a0874c).
$ git checkout iss53
Switched to branch "iss53"
$ vim index.html
$ git commit -a -m 'finished the new footer [issue 53]‘
[iss53]: created ad82d7a: "finished the new footer
[issue 53]“
 1 files changed, 1 insertions(+), 0 deletions(-)
```




## Basic Merging

```
$ git checkout master
$ git merge iss53
Auto-merging README
Merge made by the 'recursive' strategy.
README | 1 +
1 file changed, 1 insertion(+)
```




## Basic Merge Conflicts

- Hands on

## Merging master and iss53

- See https://git-scm.com/book/en/v2/Git-Branching-Basic-Branching-and-Merging for example of merging **`master`** and **`iss53`**.