

# Version Control with Git

Using git as part of your daily workflow

# Introduction

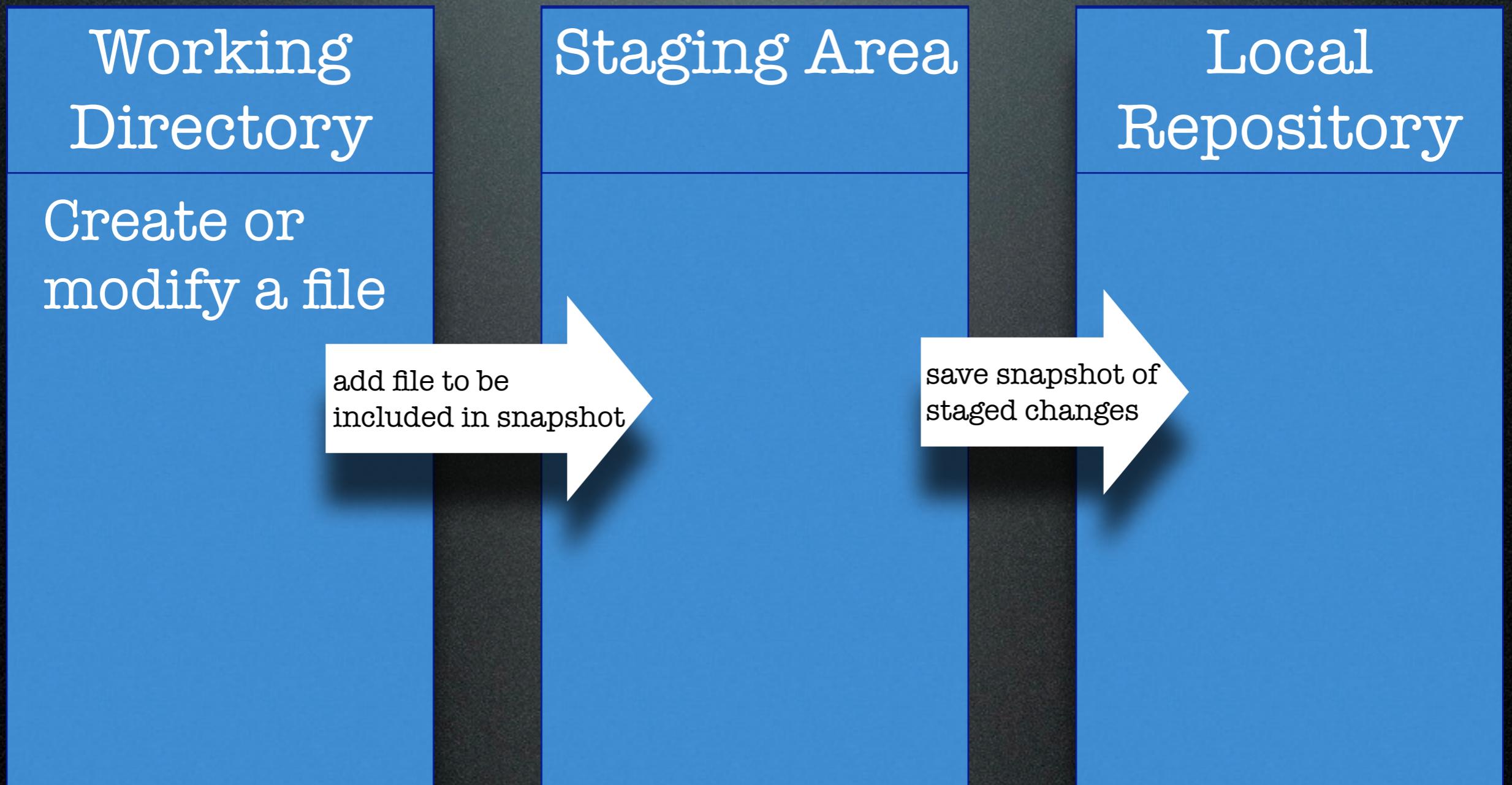
# What is version control?

- a tool to:
  - back-up files
  - save history of changes
  - collaborate and combine changes easily

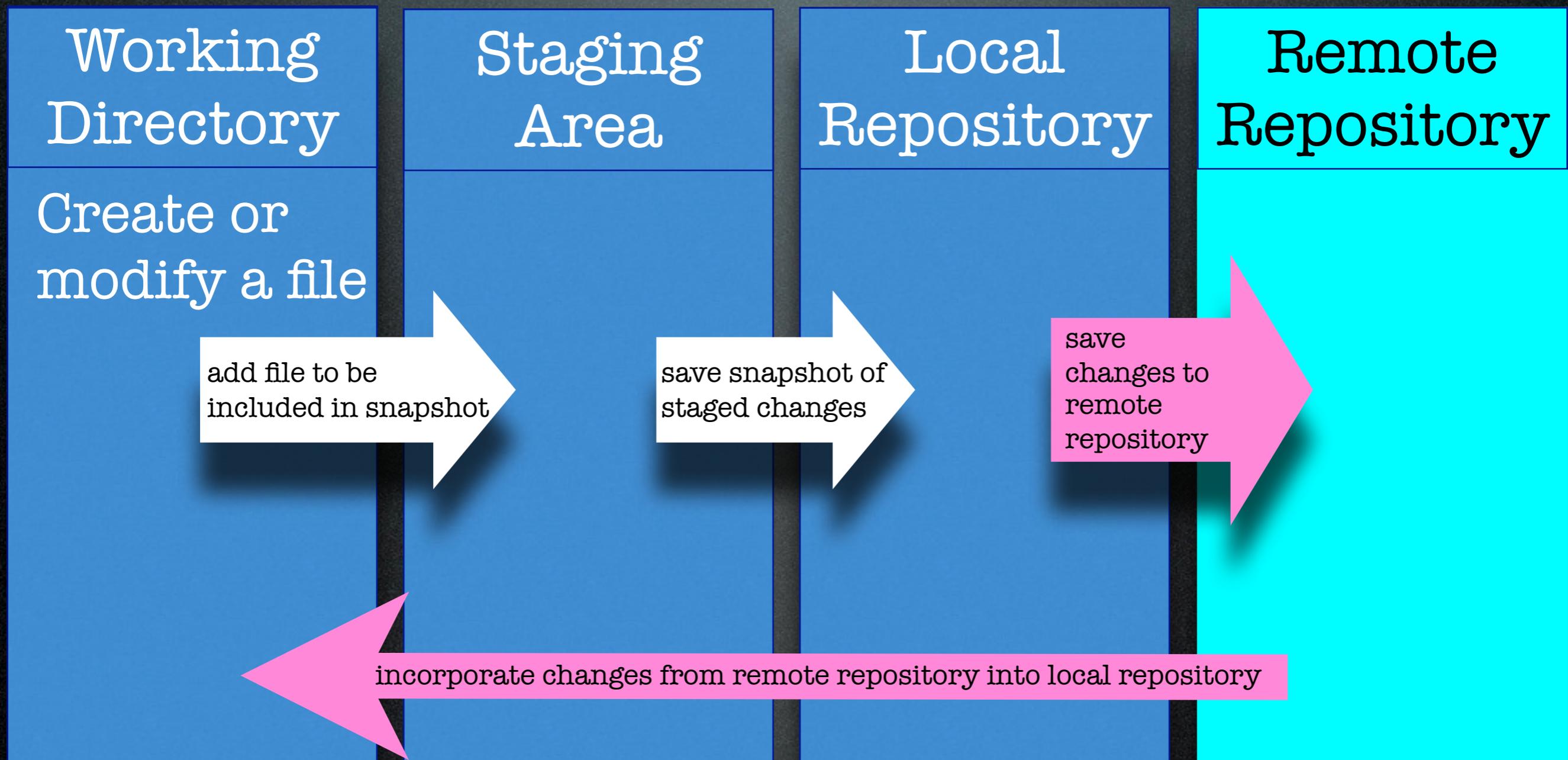
# Why version control?

- to address the following common situations:
  - avoid scripts names \_final\_final2.py
  - your code used to work and now it doesn't and you want to go back to the working version
  - recreate figures you made 2 years ago
  - find where you introduced a bug
  - avoid accidentally over-writing changes someone else made to the code
  - make your process transparent to others
  - make your code easy to share
  - avoid updating the wrong version of the code
  - know what changes you made when

# The Workflow of Local Git



# The Workflow of Distributed Git



# Telling Git who you are

- type into the shell
  - `git config --global user.name "Your Name"`
  - `git config --global user.email email@address`
  - `git config --global color.ui auto`
- you only have to do this once per machine

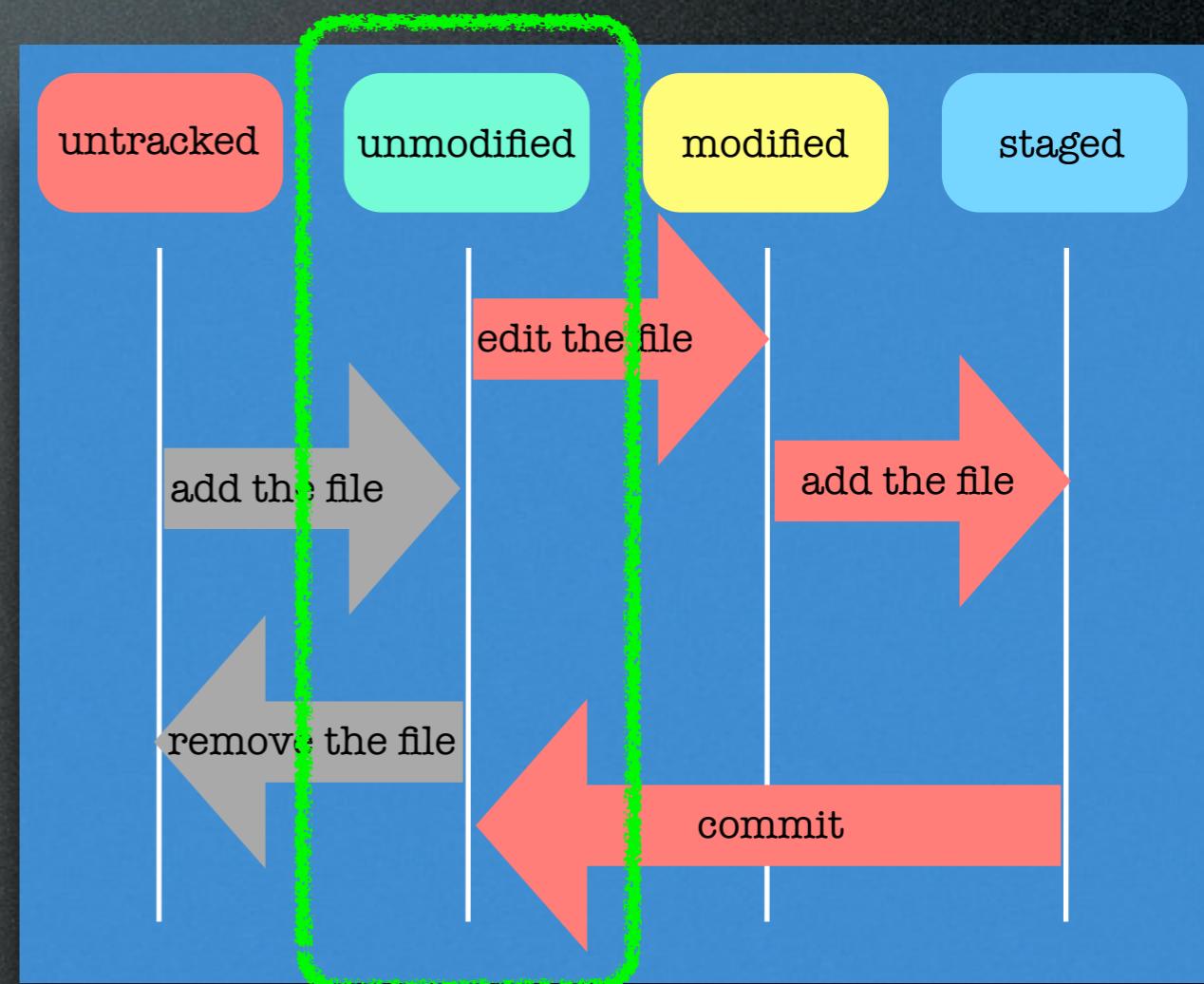
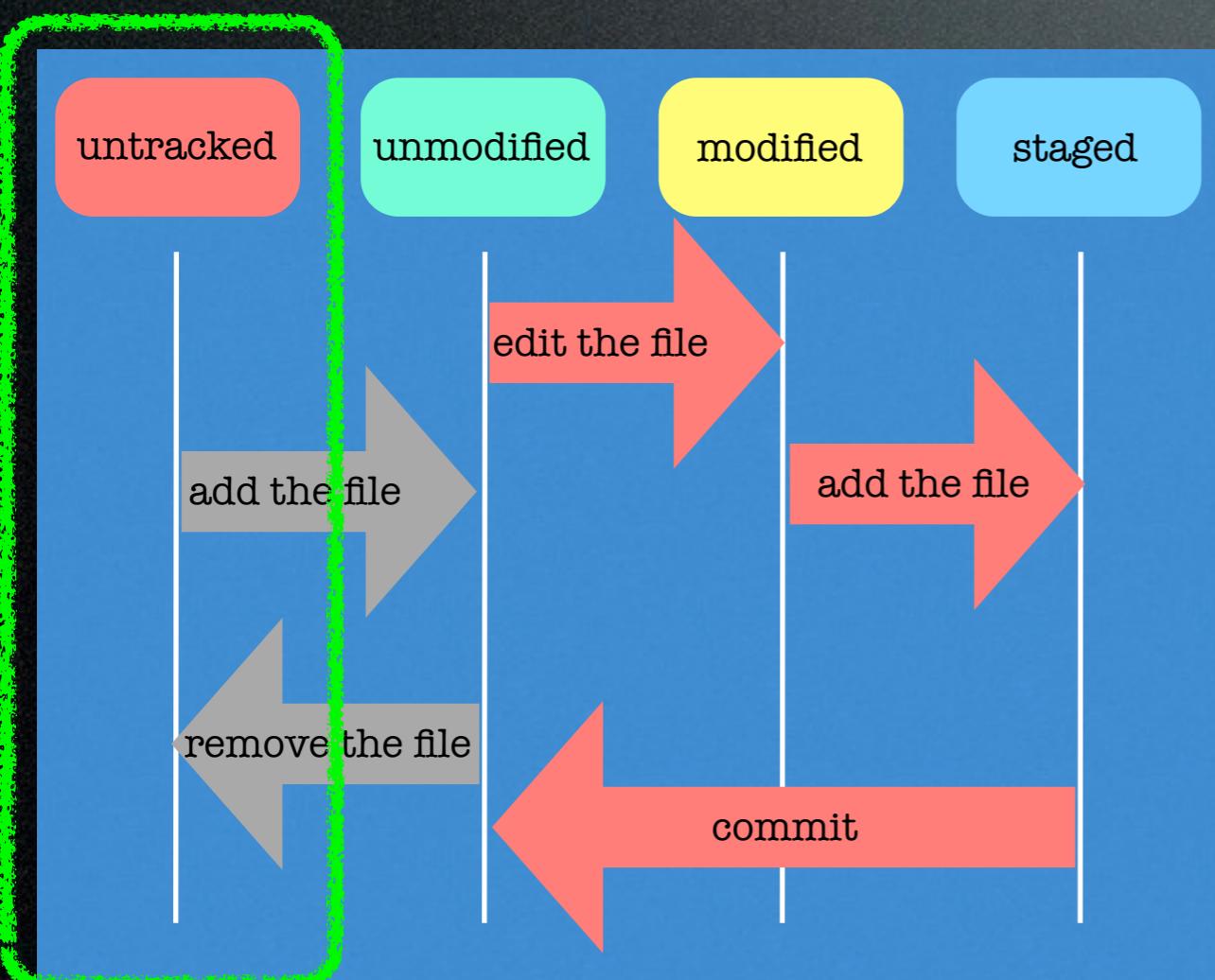
# The Basics

# Create a repository

- typing `git init` in any directory will start a repository
  - `mkdir swc_local`
  - `cd swc_local`
  - `git init`
- creates a `.git` folder with repository information

# Start tracking a file

- git add filename
- start tracking a file



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# Help

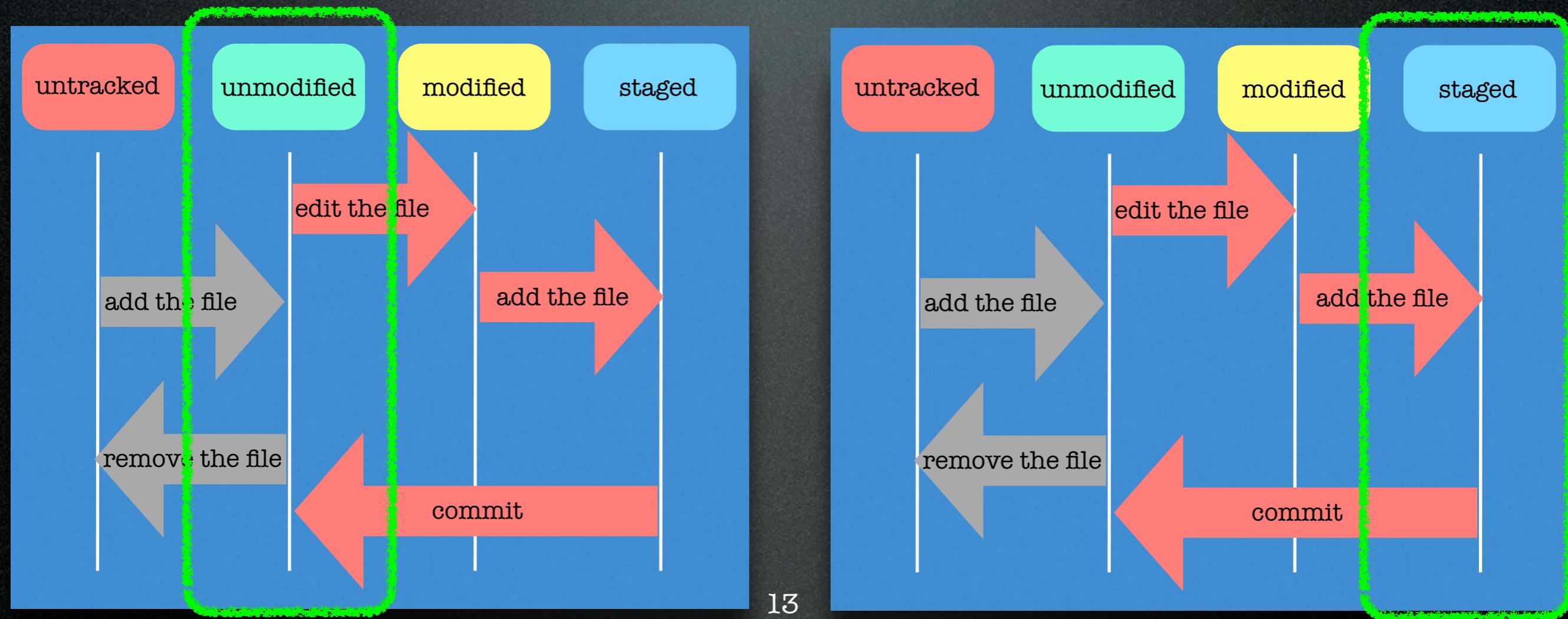
- `git status`
  - tells you the status of all files (tracked and untracked) in a directory
- `git help` or `git help command`
  - tells you how something works
  - lists possible git commands

# Exercise 1:

1. create a file called names.txt
  2. if you haven't already, create a repository
  3. start tracking the file names.txt
  4. what is the status of names.txt ?
- review:
    - git init - create repository
    - git add filename - start tracking
    - git status - what is the status of my file
    - git help - help me please

# Staging Area

- setting the stage for a commit

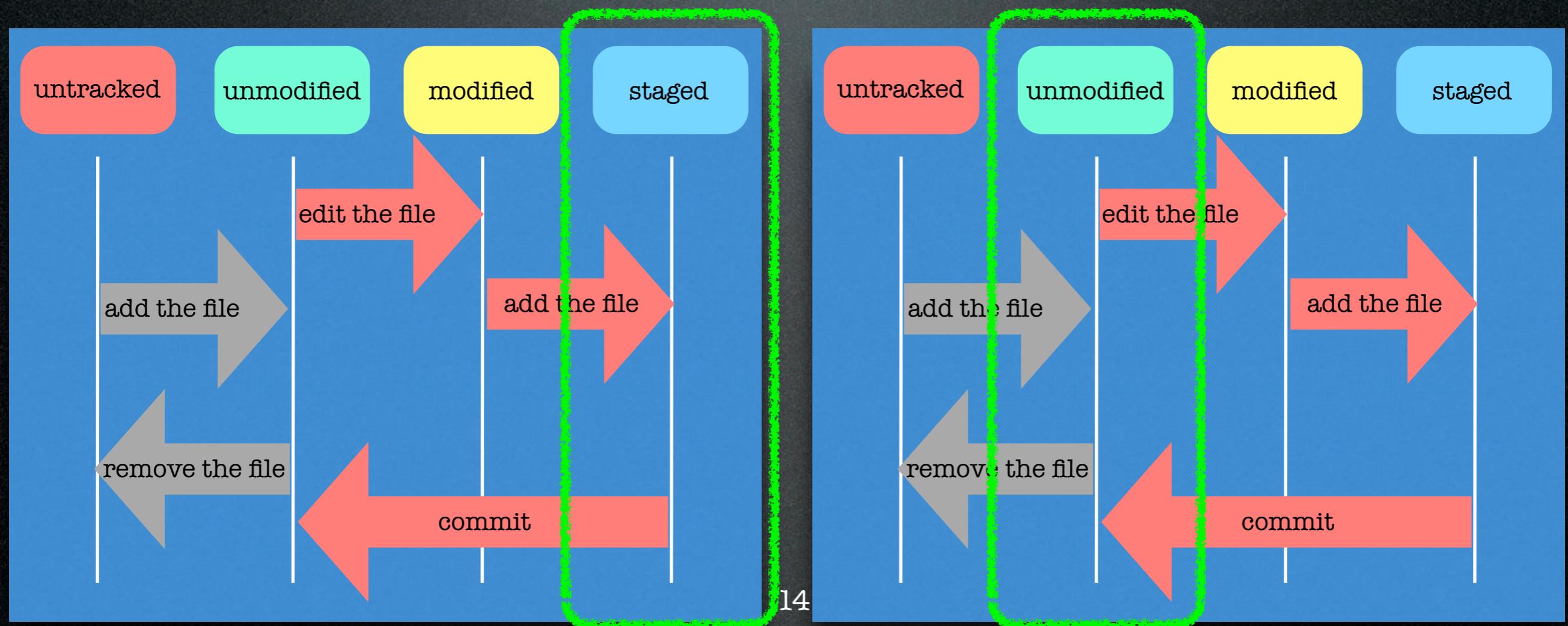


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# Committing changes

- take a picture of your staging area
- `git commit -m "detailed commit message"`
- what if you forget -m? got to your default editor (usually vi), write message, save and close



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# Exercise 2

1. if you have not already done so, commit names.txt from your staging area to your local repository
2. add the name of someone in the class to names.txt and save
  1. what is the status of names.txt?
  2. Add names.txt to your staging area
  3. what is the status of names.txt
  4. commit names.txt to your local repository
  5. what is the status of names.txt

## Cheat sheet:

- git add filename
- git commit -m “message”
- git status
- git help

# Undoing Mistakes:

- un-stage a file
  - `git reset HEAD filename`
- un-modify a file
  - `git checkout -- filename`

# Exercise 3

1. modify names.txt and save your changes
2. add names.txt to your staging area
3. remove names.txt from your staging area
4. unmodify names.txt

## Cheat sheet:

- git add filename
- git commit -m "message"
- git status
- git help
- git reset HEAD filename
- git checkout -- filename

# Viewing differences

- everything:
  - `git diff`
- a single file
  - `git diff filename`
- + added since last staging
- - removed since last staging/commit
- compares current file to file in staging area or last committed file

# Exercise 4:

1. modify names.txt and save your changes
2. use git diff to find your changes
3. stage your changes
4. run git diff again, do you get a different output?
5. commit your changes (don't forget your commit message)

## Cheat sheet:

- git add filename
- git commit -m "message"
- git status
- git help
- git reset HEAD filename
- git checkout -- filename
- git diff filename

# Viewing your commit history

- all history:
  - `git log`
- last 2 entries:
  - `git log -2`

# Shell commands in git

- `git mv`
- `git rm`

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# Exercise 5

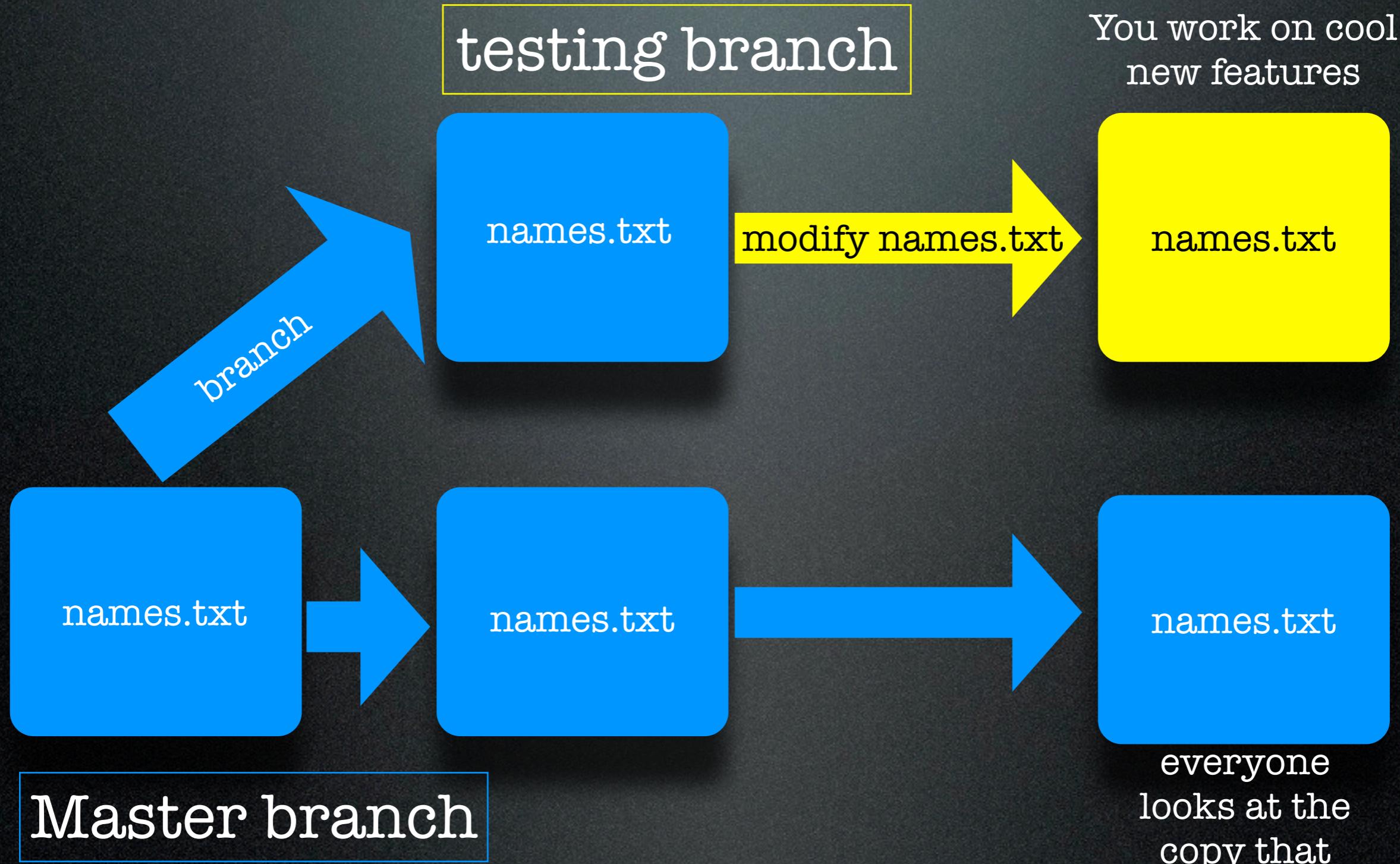
1. create a file
2. start tracking your file
3. commit your file
4. modify your file
5. stage your file
6. commit your changes

Cheat sheet:

- git add filename
- git commit -m “message”
- git status
- git help
- git reset HEAD filename
- git checkout -- filename
- git diff filename

# Advanced Git

# Why branch?



Actually modify names.txt on the testing branch

# Branching

- create a branch called testing
  - `git branch testing`
- ask git which branch you are on:
  - `git branch`
- switch to the testing branch
  - `git checkout testing`

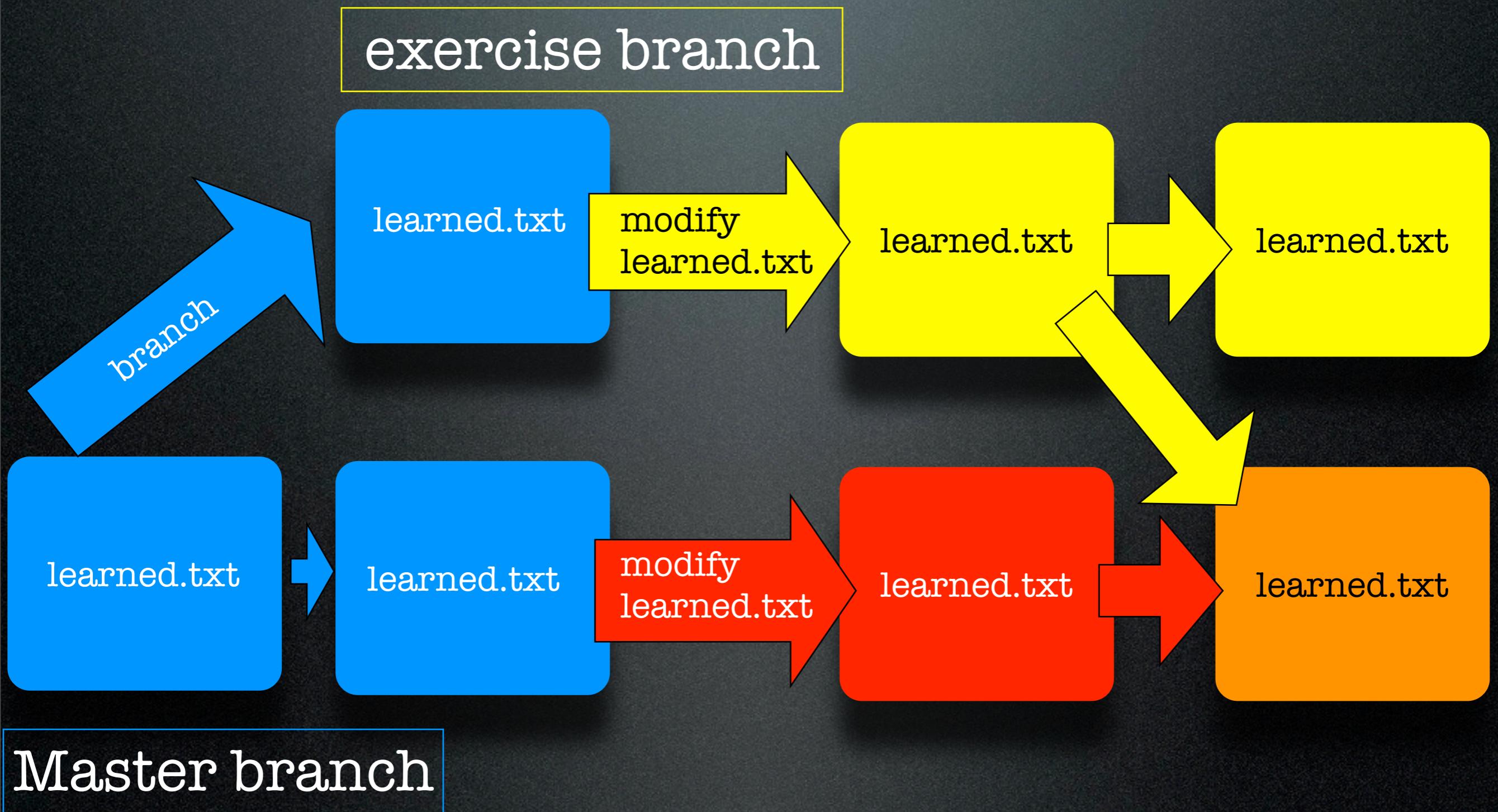
# Exercise 6:

1. create a new file called learned.txt and type something new you learned today
2. before you add and commit the file:
  1. is it visible in your file system when you are on the master branch?
  2. what about from the testing branch?
3. add and commit your file to your master branch
4. now is it visible in your file system on the master branch? on testing? why is this different from #2?
5. create a branch called exercise from master
6. move to exercise branch and modify learned.txt
7. add and commit learned.txt to the exercise branch
8. go to the master branch. Are your modifications to learned.txt visible?
9. modify learned.txt on your master branch. Before you commit your changes, try to move to the exercise branch. Can you? What error message do you get?
10. add and commit your changes to the master branch

## Cheat sheet:

- git add filename
- git commit -m "message"
- git status
- git help
- git reset HEAD filename
- git checkout -- filename
- git diff filename
- git branch branch\_name
- git checkout testing

# Merging



Master branch

Bostroem

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<http://pcottle.github.io/learnGitBranching/?NODEMO>  
git commit  
git branch exercise  
git checkout exercise  
git commit  
git checkout master  
git commit  
git merge exercise  
git commit

# Merging

- go to the branch you want to merge into
- `git merge branch_you_want_to_merge`
- no conflicts: awesome
- conflicts:
  - resolve, add, commit
- merging doesn't delete or modify the merged branch
- delete merged branch
  - `git branch -d branch_name`

# Exercise 7

1. merge learned.txt from  
the exercise branch to  
the master branch

2. resolve any conflicts

3. delete the exercise  
branch

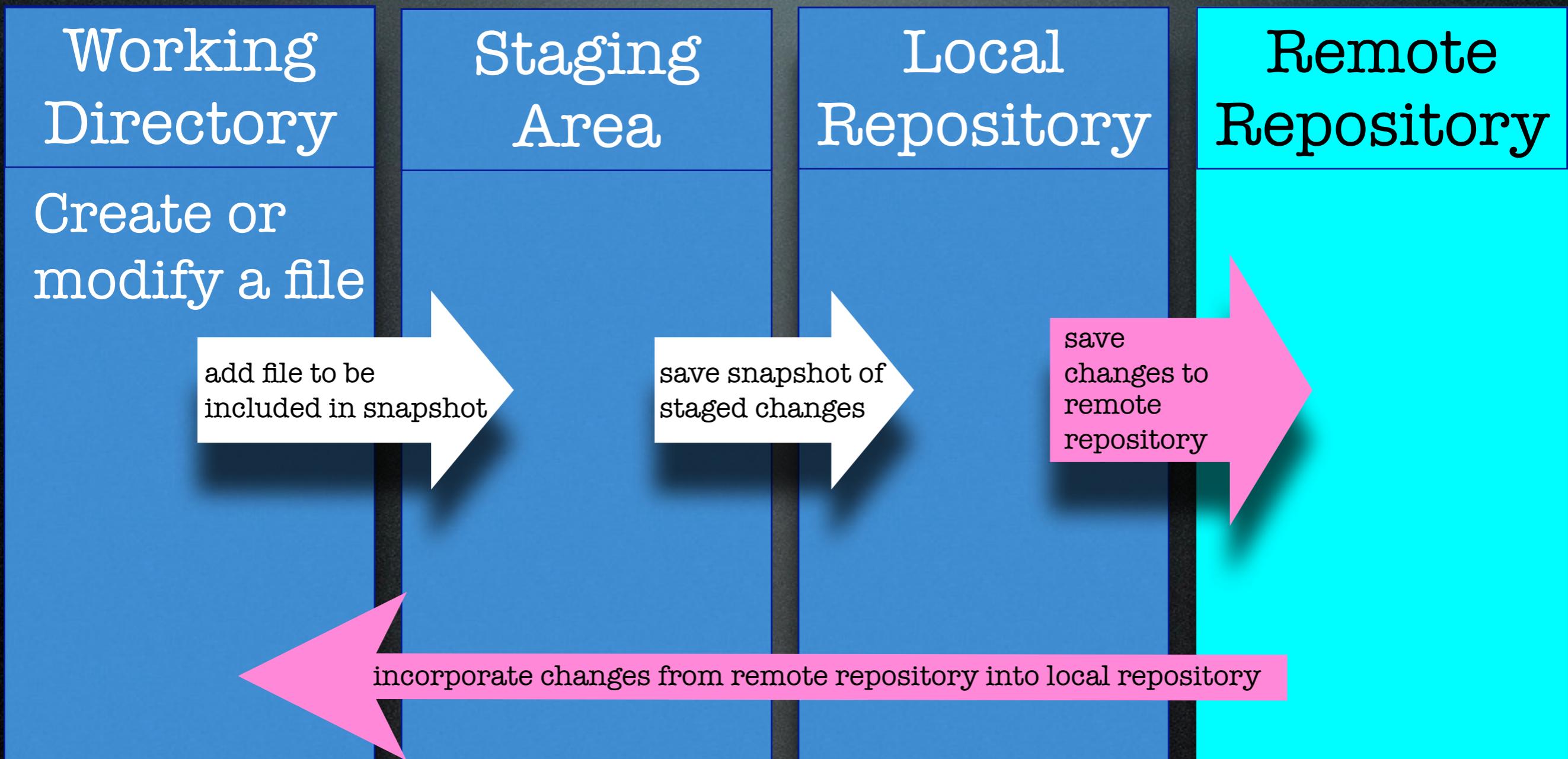
## Cheat sheet:

- git add filename
- git commit -m “message”
- git status
- git help
- git reset HEAD filename
- git checkout -- filename
- git diff filename
- git branch branch\_name
- git checkout testing
- git merge branch\_to\_merge
- git branch -d branch\_to\_delete

# Resources

- This presentation
- <http://git-scm.com/book/en/>
- <http://pcottle.github.io/learnGitBranching/>

# The Workflow of Distributed Git



1. cd out of your swc\_local repository
2. PUT GIT CLONE BRANCH COMMAND HERE