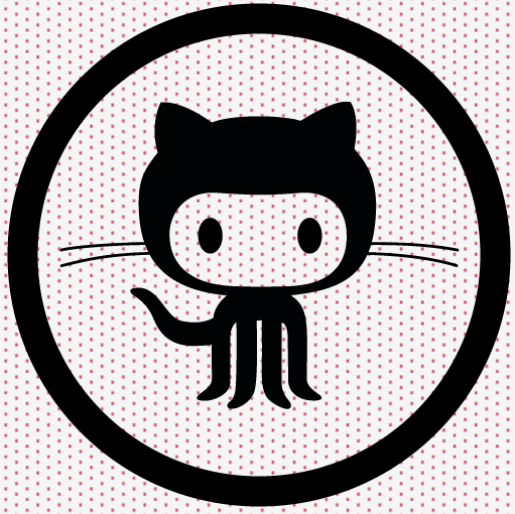
Git And GitHub for Beginners

Overview



Github icon

1. Install git and create a Github account
2. What is git?
3. How does git work?
4. What is GitHub?
5. Quick example using git and GitHub

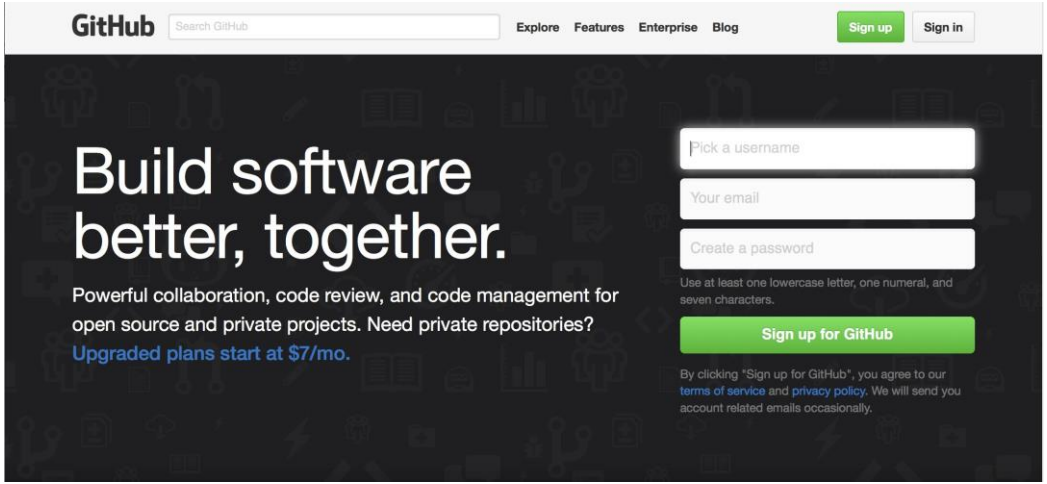
1 Install git and a create GitHub account

Install git

- **Linux (Debian)**
  - Command: `sudo apt-get install git!`
- **Linux (Fedora)**
  - Command: `sudo yum install git!`
- **Mac**
  - http://git-scm.com/download/mac
- **Windows**
  - http://git-scm.com/download/win

Create Github account

- www.github.com
- Free for public repositories



What is version control?

- A system that keeps records of your changes
- Allows for collaborative development
- Allows you to know who made what changes and when
- **Allows you to revert any changes and go back to a previous state**

2 What is git?

What is version control?

- Distributed version control
- Users keep entire code and history on their location machines
- Users can make any changes without internet access
- (Except pushing and pulling changes from a remote server)

What is git?

- Started in 2005

- Created by Linus Torvald to aid in Linux kernel development

Git icon

What is git?

- Git isn’t the only version control system

- But (we think) it’s the best

3 How does git work?

How does git work?

- Can be complicated at first, but there are a few key concepts
- Important git terminology in following slides are blue

Key Concepts: Snapshots

- The way git keeps track of your code history

- Essentially records what all your files look like at a given point in time
- You decide when to take a snapshot, and of what files
- Have the ability to go back to visit any snapshot
- Your snapshots from later on will stay around, too

Key Concepts: Commit

- The act of creating a snapshot
- Can be a noun or verb
- “I commited code”

- "I just made a new commit"
- Essentially, a project is made up of a bunch of commits

Key Concepts: Commit

- Commits contain three pieces of information:

1. Information about how the files changed from previously
2. A reference to the commit that came before it
   - Called the "parent commit"

3. A hash code name

- Will look something like:
  fb2d2ec5069fc6776c80b3ad6b7cbde3cade4e

Key Concepts: Repositories

- Often shortened to ‘repo’
- A collection of all the files and the history of those files
- Consists of all your commits
- Place where all your hard work is stored

Key Concepts: Repositories

- Can live on a local machine or on a remote server (GitHub!)
- The act of copying a repository from a remote server is called cloning
- Cloning from a remote server allows teams to work together

Key Concepts: Repositories

- The process of downloading commits that don’t exist on your machine from a remote repository is called pulling changes
- The process of adding your local changes to the remote repository is called pushing changes

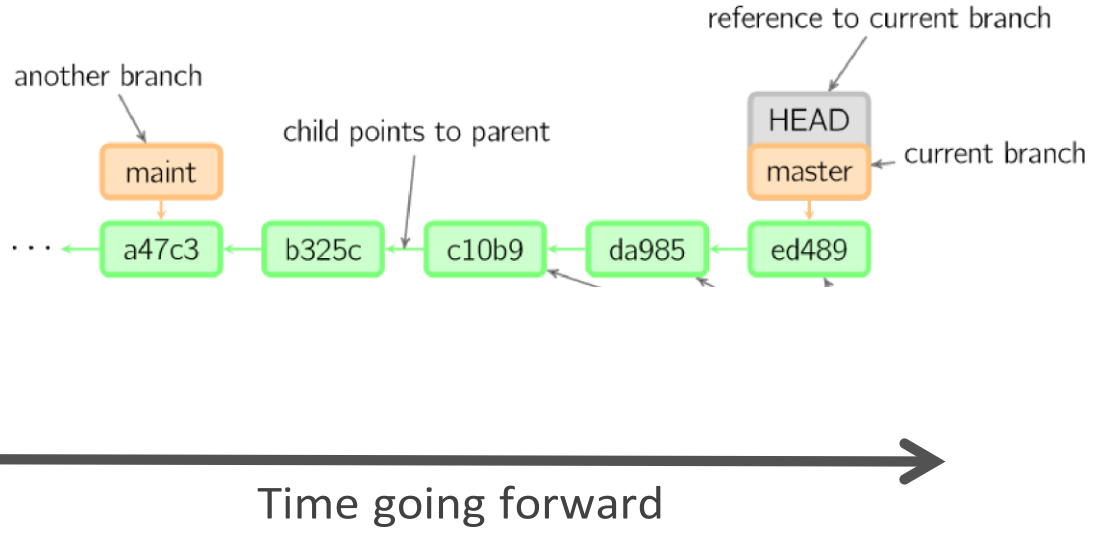
Key Concepts: Branches

- All commits in git live on some branch
- But there can be many, many branches
- The main branch in a project is called the master branch

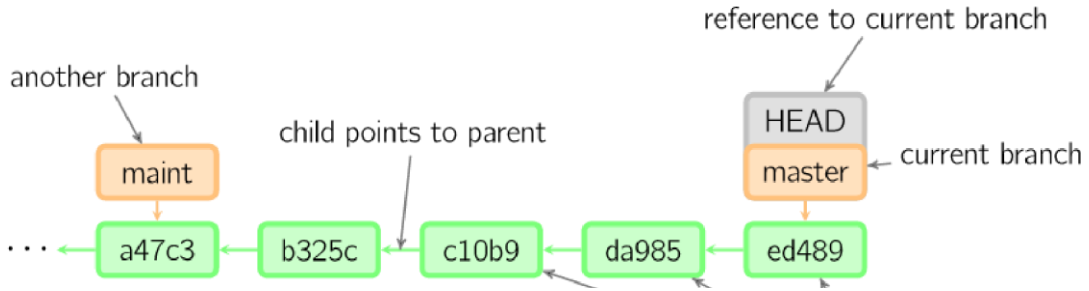
So, what does a typical project look like?

- A bunch of commits linked together that live on some branch, contained in a repository
- Following images taken and modified from:
- http://marklodato.github.io/visual-gitguide/index-en.html
- Also a good tutorial!

So, what does a typical project look like?

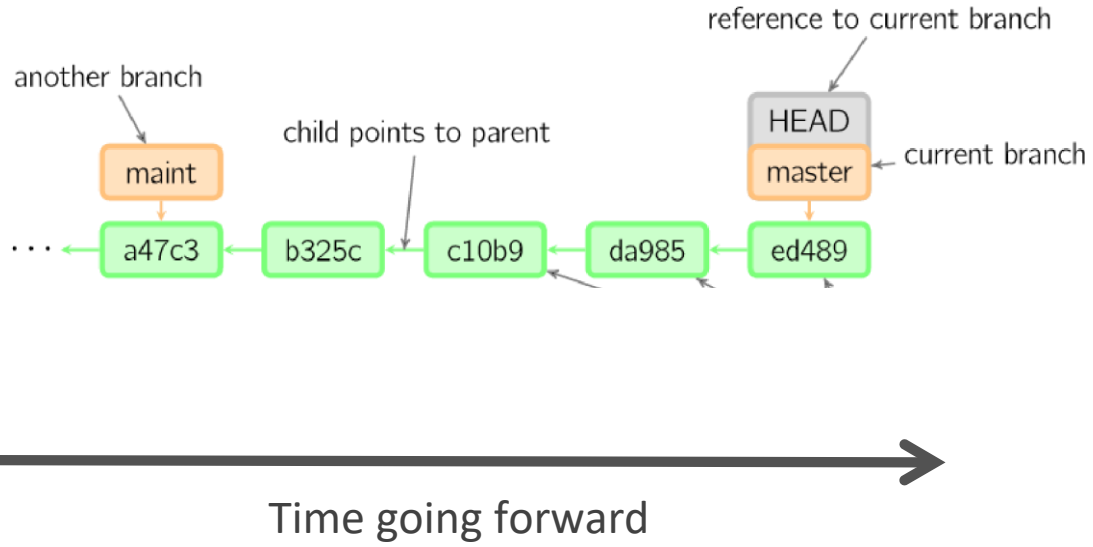


So, what is HEAD?



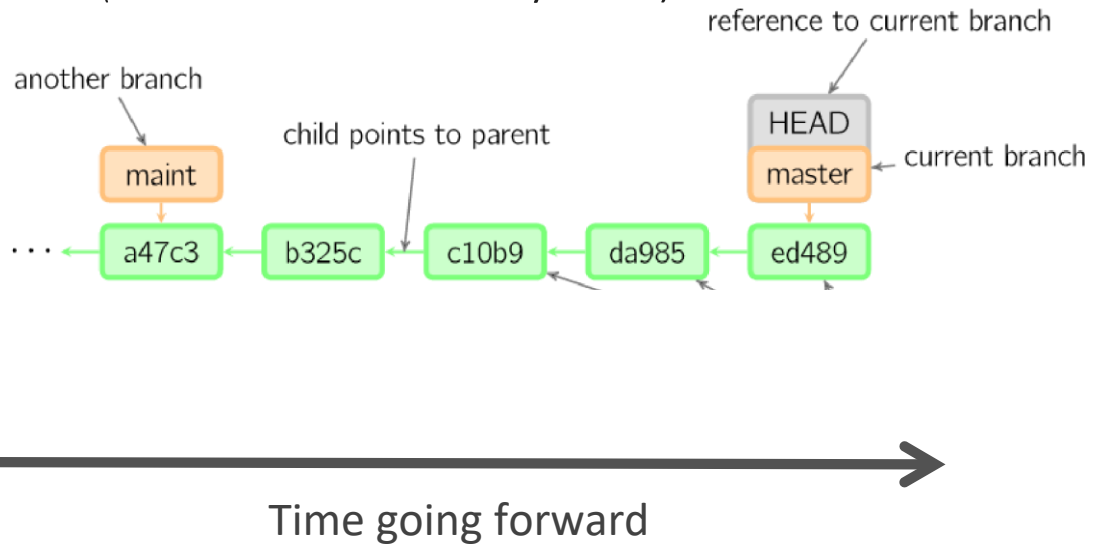
So, what is HEAD?

- A reference to the most recent commit



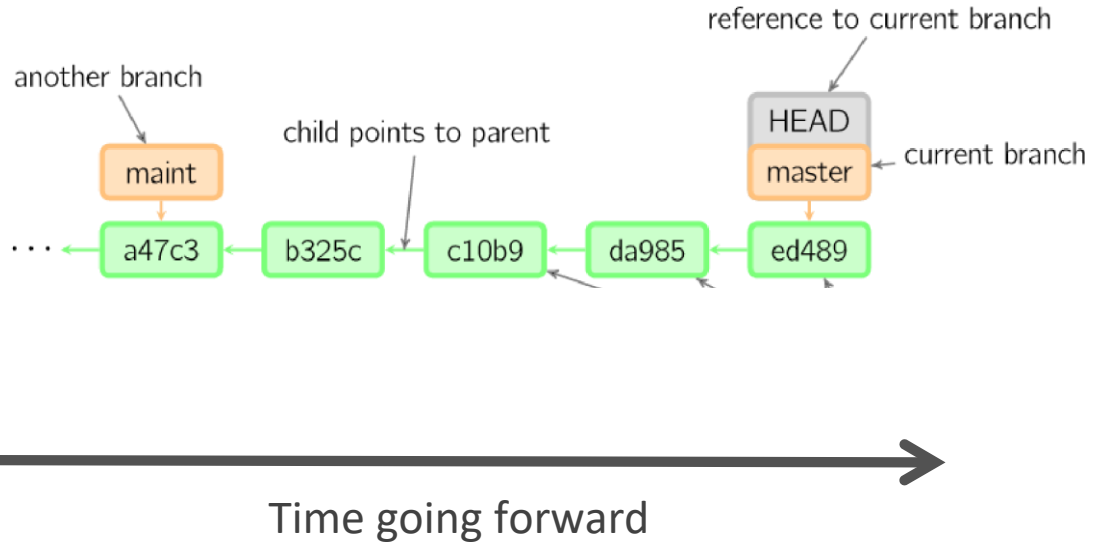
So, what is HEAD?

- A reference to the most recent commit
  - (in most cases – not always true!)



So, what is MASTER?

- The main branch in your project
- Doesn't have to be called master, but almost always is!

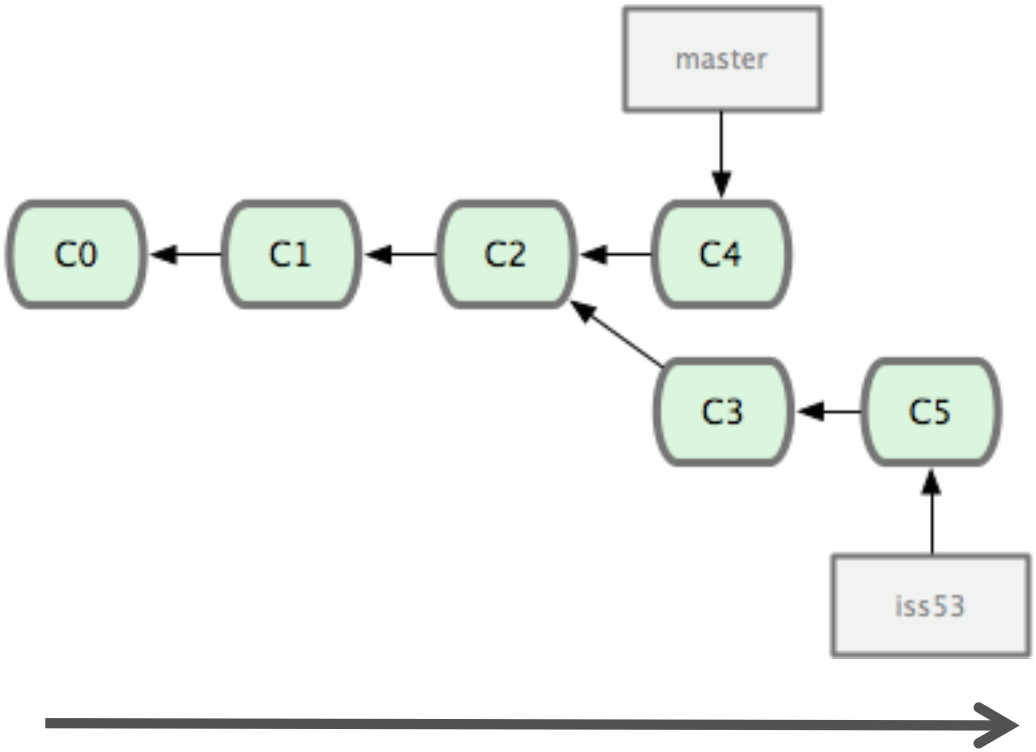


Key Concepts: Branching off of the master branch

- The start of a branch points to a specific commit
- When you want to make any changes to your project you make a new branch based on a commit

Key Concepts: Branching off of the master branch

Images from:
http://codingdomain.com/git/merging/

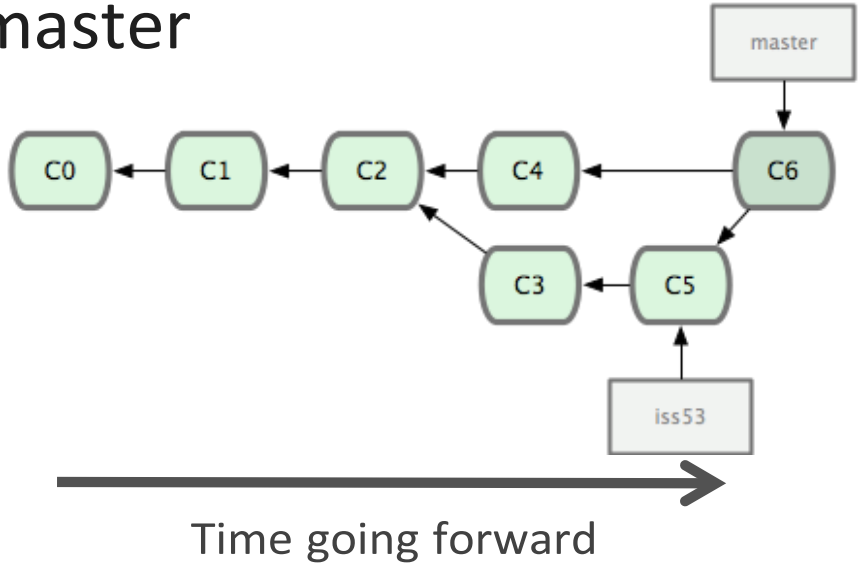

master
C0
C1
C2
C4
C3
C5
iss53

Time going forward

Key Concepts: Merging

- Once you're done with your feature, you merge it back into

master



Key Concepts: How do you make a commit anyway?

- There are a lot of ‘states’ and ‘places’ a file can be
- Local on your computer: the ‘working directory’
- When a file is ready to be put in a commit you add it onto the ‘index’ or ‘staging’

Key Concepts: How do you make a commit

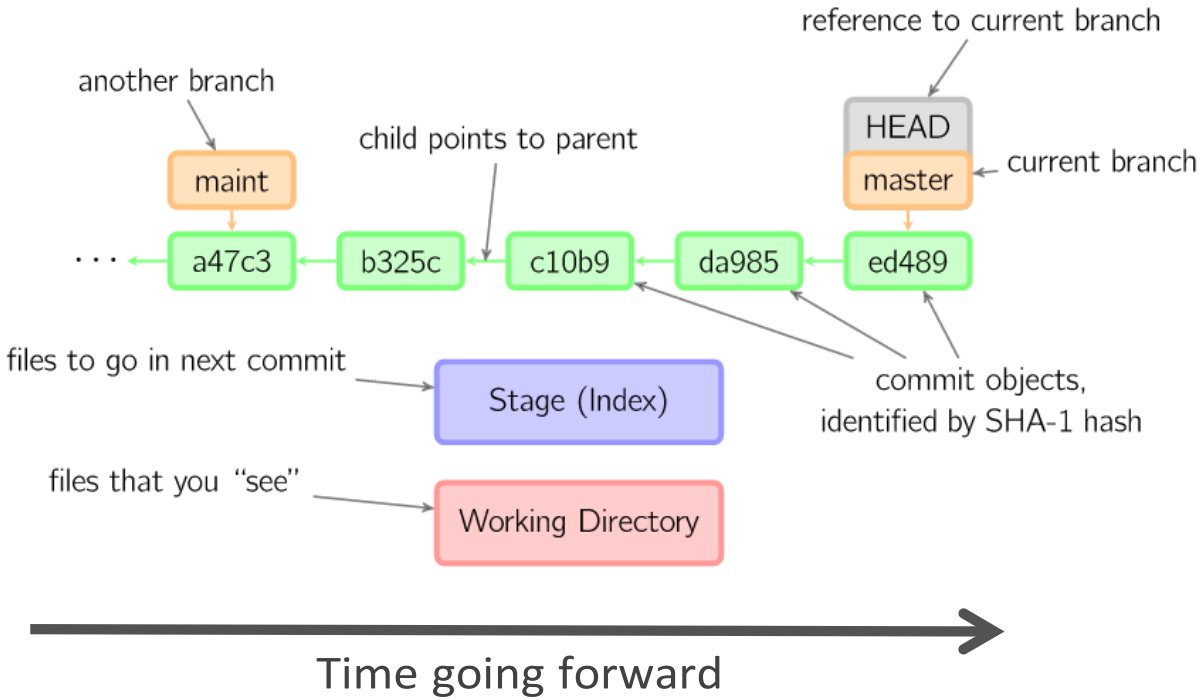
- Staging is the new preferred term – but you can see both ‘index’ and ‘staging’ being used anyway?

- The process:
- Make some changes to a file
- Use the ‘git add’ command to put the file onto the staging environment

Key Concepts: How do you make a commit

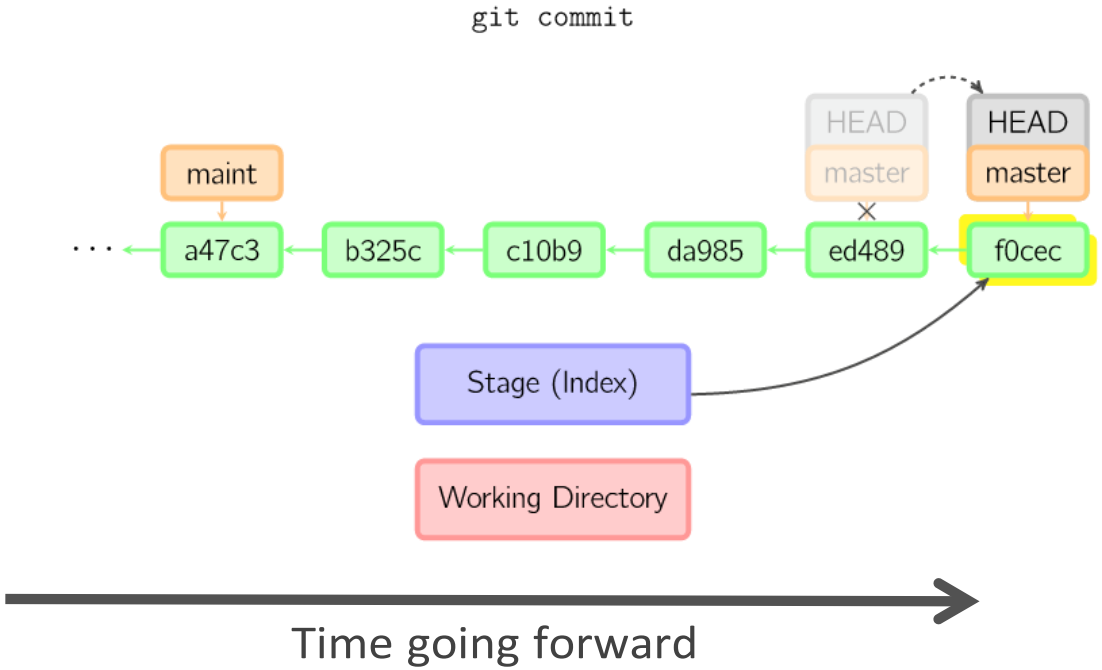
- Use the ‘git commit’ command to create a new commit’

Key Concepts: How do you make a commit anyway?



Key Concepts: How do you make a commit anyway?

Key Concepts: How do you make a commit



4 What is GitHub?

What is GitHub?

- www.github.com
- Largest web-based git repository hosting service
- Aka, hosts ‘remote repositories’
- Allows for code collaboration with anyone online
- Adds extra functionality on top of git

Octocat!

- UI, documentation, bug tracking, feature requests, pull requests, and more!

What is GitHub?

- Founded in 2008
- Also has an Enterprise edition for businesses

Octocat!

Additional Resources

Additional Resources

- Official git site and tutorial:
  https://git-scm.com/
- GitHub guides:
  https://guides.github.com/
- Command cheatsheet:
  https://training.github.com/kit/downloads/github-git-cheat-sheet.pdf
- Interactive git tutorial:

https://try.github.io/levels/1/challenges/1

- Visual/interactive cheatsheet:
  http://ndpsoftware.com/git-cheatsheet.html