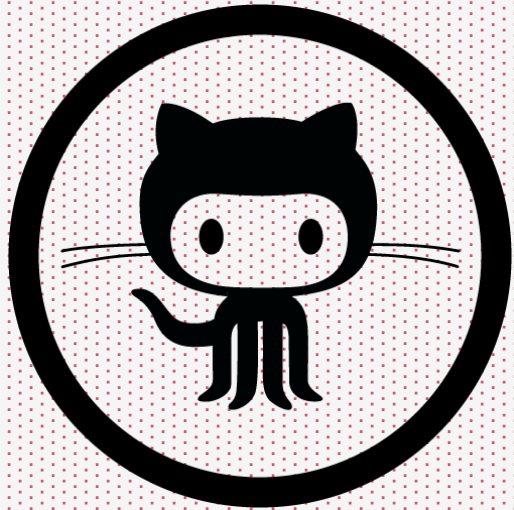

Git 101:

Git and GitHub for Beginners



Github icon

Overview

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

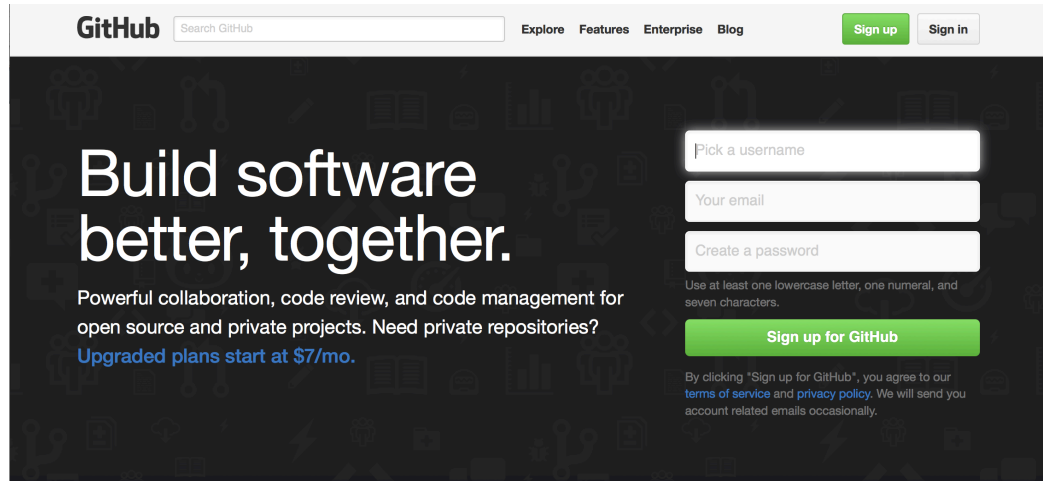
1 Install git and a create GitHub account

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



The screenshot shows the GitHub homepage with a focus on the sign-up process. The header includes the GitHub logo, a search bar, and navigation links for Explore, Features, Enterprise, and Blog. On the right side of the header are 'Sign up' and 'Sign in' buttons. The main content area has a dark background with the text 'Build software better, together.' and a description of GitHub's capabilities. To the right of this text are three input fields for 'Pick a username', 'Your email', and 'Create a password'. Below these fields is a green 'Sign up for GitHub' button. At the bottom, there is a small disclaimer about the terms of service and privacy policy.

GitHub

[Explore](#) [Features](#) [Enterprise](#) [Blog](#) [Sign up](#) [Sign in](#)

Build software better, together.

Powerful collaboration, code review, and code management for open source and private projects. Need private repositories?
[Upgraded plans start at \\$7/mo.](#)

Use at least one lowercase letter, one numeral, and seven characters.

[Sign up for GitHub](#)

By clicking "Sign up for GitHub", you agree to our [terms of service](#) and [privacy policy](#). We will send you account related emails occasionally.

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 committed 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

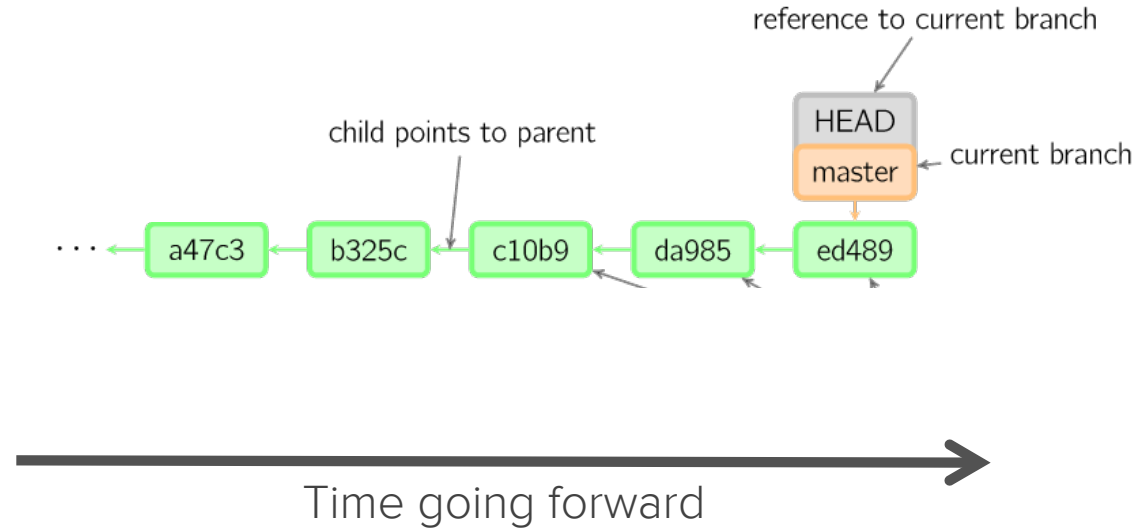
Key Concepts: Branches

- 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

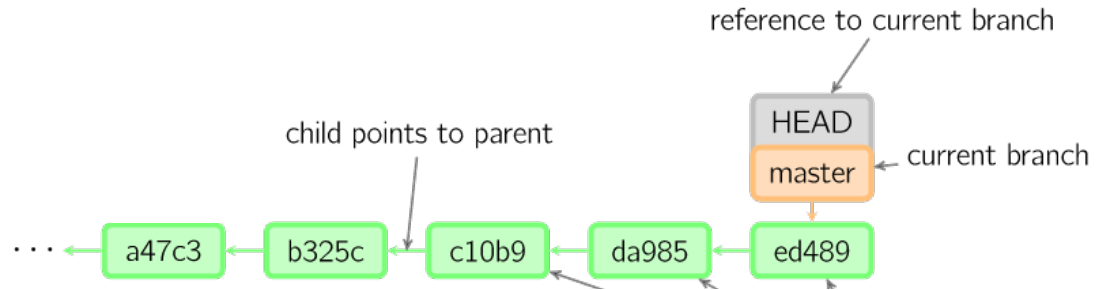
So, what does a typical project look like?

- 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-git-guide/index-en.html>
 - Also a good tutorial!

So, what does a typical project look like?

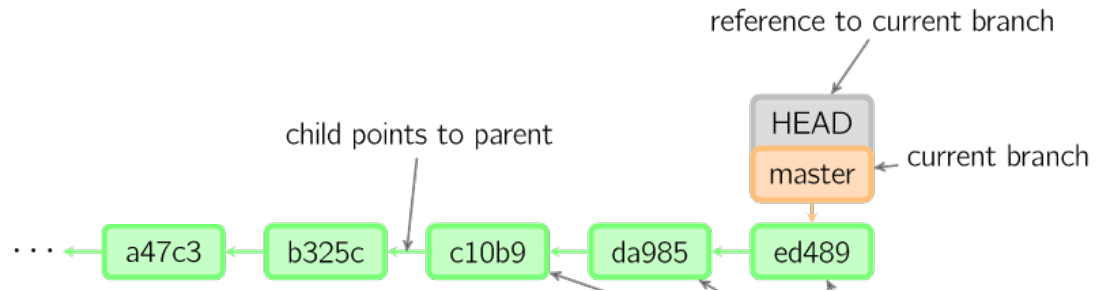


So, what is HEAD?



So, what is HEAD?

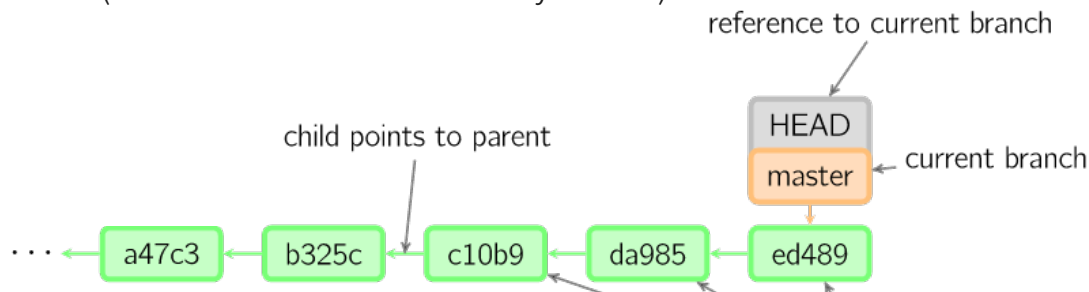
- A reference to the most recent commit



Time going forward

So, what is HEAD?

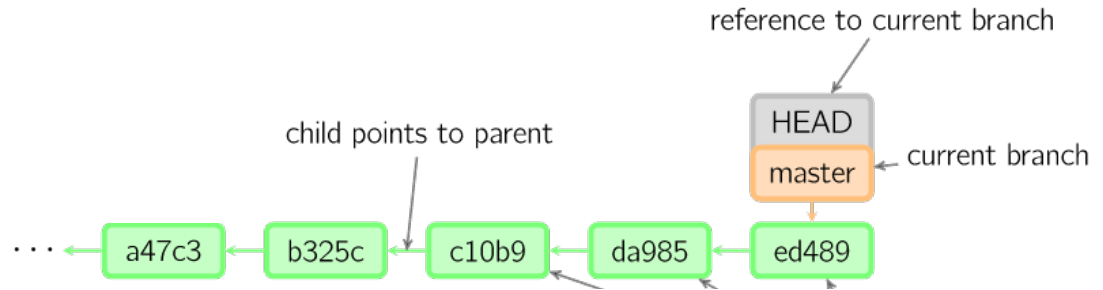
- A reference to the most recent commit
 - (in most cases – not always true!)



Time going forward →

So, what is MASTER?

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

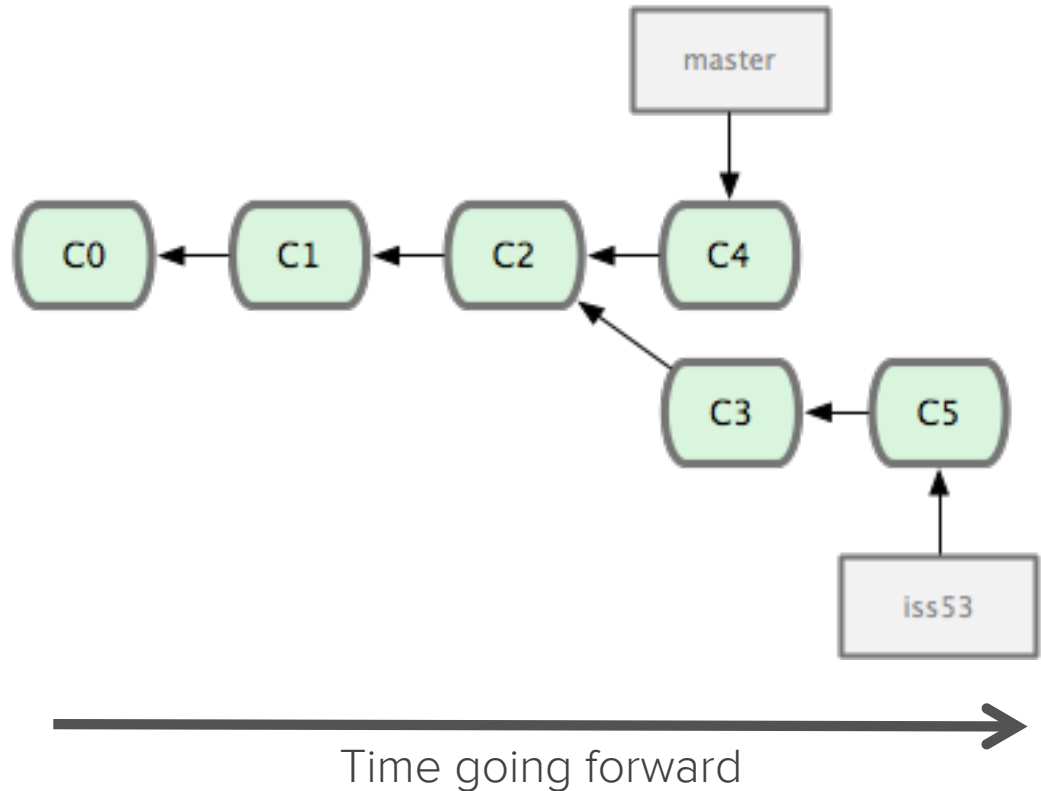


Time going forward →

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

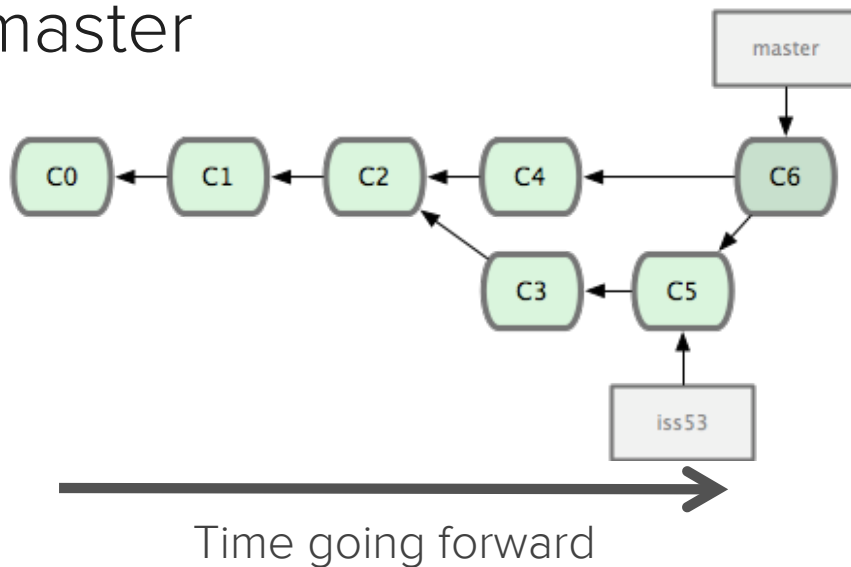
Key Concepts: Branching off of the `master` branch



Images from:
[http://codingdomain.com/
git/merging/](http://codingdomain.com/git/merging/)

Key Concepts: Merging

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



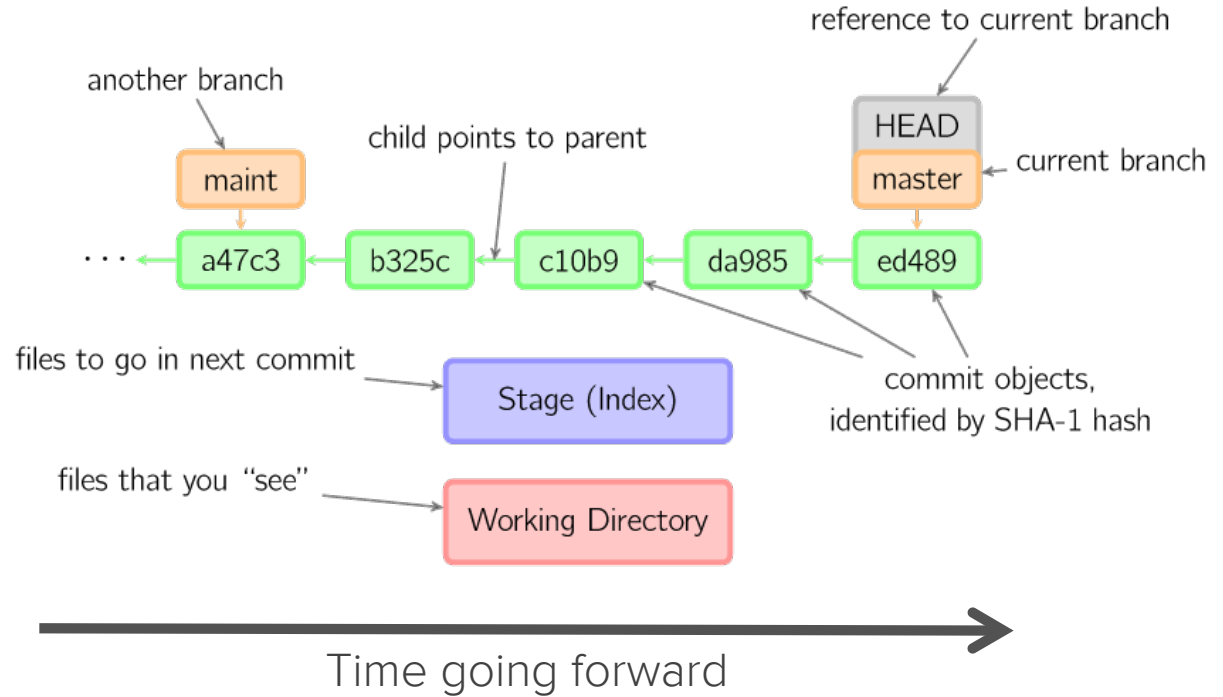
Key Concepts: How do you make a commit anyway?

- 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](#)’
 - Staging is the new preferred term – but you can see both ‘index’ and ‘staging’ being used

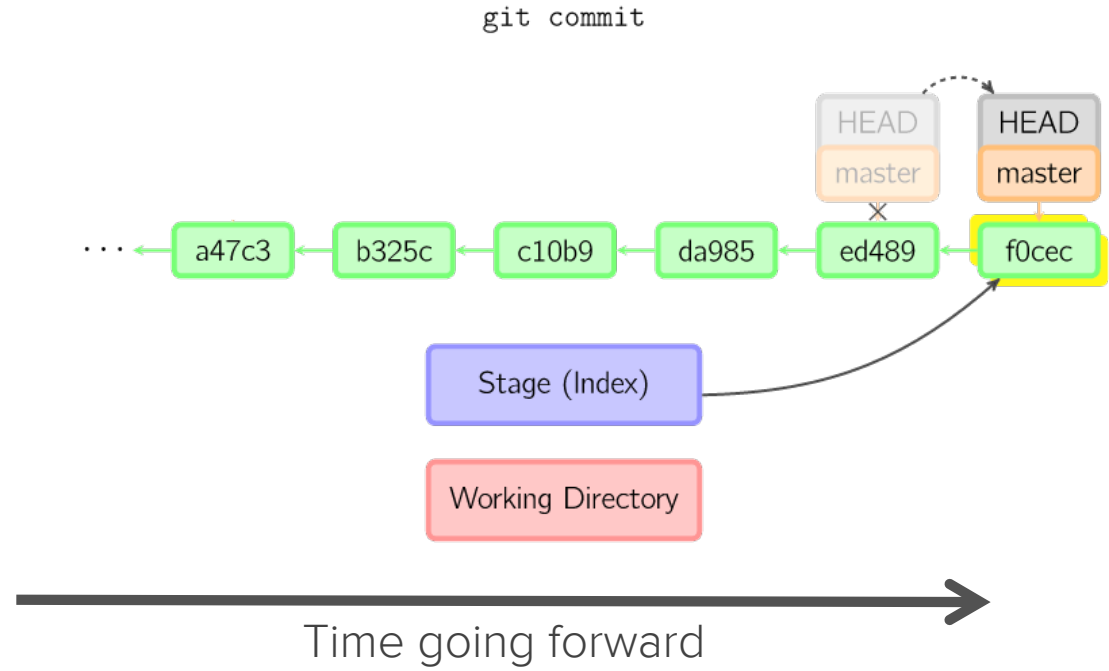
Key Concepts: How do you make a commit anyway?

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



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



Octocat!

What is GitHub?

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





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>