GIT Tutorial

A Quick Note: *This tutorial makes the assumption that you have already created a repository on the github.com site. If not, please go back and do that first.*

**Connecting to GitHub**

1. Connect to GitHub (*ssh –T* [*git@github.com*](mailto:git@github.com))
2. Set up *git config –global user.name “Your Name”*
3. *Git config –global user.email [your email]*

**Creating A Repository**

1. Create a directory for your project (*mkdir ~/[project]*)
2. Change to your new project directory using *cd ~/[project]*
3. Use *git init* to make your new project a repository

**Checkout A Repository**

There will be times where you will need to start with a repository that was created offsite (from either a co-worker or even a different computer of yours). If you’re familiar with SVN then the concept of a checkout is nothing new. If you are not, then think of checkout like being in a grocery store. You have all of the items in a basket (repository) and you need to purchase them. Going through the checkout will give you all of the items in your basket and allow you to use them as you please.

To check out use the following steps:

1. *Git clone [username]@[address].com:/path*

That’s it! You should now have a local copy of the complete repository!

**Adding and Committing Your Files**

1. Add/Create your files in your new project’s directory
2. Once you have your files use *git add .* to add all files to your commit queue (you can also use *git add [file]* if you want to be specific)
3. Great! Now we can commit our files! Use *git commit –m ‘[message]’* and all of your added files will now be added to your repository!
   1. You can also use *git commit –a –m ‘[message]’* to add and commit all of your modified files
4. If you are using GitHub you can now create a repository online by using *git remote add origin* [*git@github.com:[username]/[directory].git*](mailto:git@github.com:[username]/%5bdirectory%5d.git) and then *git push origin master*

Congratulations! You should now have an existing repository on GitHub. A quick workflow would be something like this:

1. *Git commit –a –m ‘[message]’*
2. and then when you are ready to show off your changes use *[git push origin master]*

**Creating Branches**

Another Quick Note: *Branching is the act of creating another commit that is an aside from the “trunk” of your repository. For example: (shamelessly stolen from* <http://www.eecs.harvard.edu/~cduan/technical/git>)*“*Say you are working on a paper. You’ve gotten a first draft out, submitted for review. You then get a new batch of data, and you’re in the process of integrating it into the paper. Halfway in, however, the review committee calls you up and tells you that you need to change some of your section headings to conform to format specifications. What do you do?

Obviously you don’t want to send them your half-baked revisions with corrected headings. What you want to do is jump back to the version you sent out, change the headings on that version, and send off that copy, all the while keeping your recent work safely stored somewhere else.*”*

*To perform the action above, please follow the steps below:*

1. *git branch [new-head-name] [reference to a specific commit]*
   1. Say we have commits A,B,C and we need to create a branch at commit B we would use this command *git branch new-branch HEAD^*
      1. The *HEAD^* references the parent of the current HEAD.
   2. If you want to go further then you must refer to your commit by its SHA1 name either in full or by the first few characters (barring that no other commit shares the exact same string of characters)

**Committing From Your New Branch**

1. To switch to your new branch use the command *git checkout [head-name]*
   1. **NOTE: You must commit your changes before you run *git checkout.* If you do not then git will start acting wonky**
2. You can now commit your changes as normal (but now your commits will only show up on your new branch).
3. To push your branch to GitHub use *git push origin –u [branch name]*

Great! You should now have a new branch! You can check to see all of your branches using the command *git branch*. You can also check them out on github (provided that you followed step 3)

**Merging**

There will be times when you want to merge your branches back into your master branch. The process is fairly simple from a git perspective, but will sometimes require some legwork from the user if there are conflicts between the commits.

1. **Make sure to commit all of your changes before you switch branches.**
2. Use *git checkout master* to move to your master branch.
3. *git merge [target\_branch]* – what this does is merge the [target\_branch] with your master branch.
4. Once your branches are merged you will have to use *git add [file name]* and then perform a commit to see the result on your master.

**Git Commands to Remember**

**mkdir [project]** – makes a directory

**cd [project]** – changes your location to a new directory

**git init** – use after *mkdir* to turn your directory into a git repository

**ssh –T** [**git@github.com**](mailto:git@github.com) – use to connect to github

**git add [file]** – to add a file to your commit

**git commit –m ‘[message]’** – to commit your files

**git commit –a –m ‘[message]’** – to add and commit all of your files

**git push origin master** – to push your changes to your repository on github

**git status** – see which files have changed

**git log** – to see all of your previous commits

**git branch** – will list the existing heads with an “\*” next to the current head

***git branch [new-head-name] [reference to a specific commit]*** – creating a new branch

**git diff [head1]…[head2]** – this will show you the difference between two heads.

**git checkout [head-name]** – points HEAD to the commit object specified

**git merge [target\_branch]** – use this command to merge your current branch with your target one

**git pull** – this will fetch and then merge remote commits to your local copy

**INCASE STUFF BREAKS**

**git checkout – [filename]** – This will replace the changes in your current branch with the last content in HEAD. All added files will still exist

**git fetch origin -> git reset –hard origin/master** – Will drop all local changes and commits to fetch the latest history from the server

**COOL STUFF**

**gitk** – brings up a simple GUI with a visualization of your current repo structure

**Git Definitions**

**HEAD** – HEAD is, in a nutshell, the most recent commit on your working branch.

**^** - the caret directs to the parent of the commit. IE: HEAD^ would point to the commit prior to the latest

**Good People**

<http://book.git-scm.com/>

<http://progit.org/book/>

<http://think-like-a-git.net/>

<http://help.github.com/>

<http://marklodato.github.com/visual-git-guide/index-en.html>

<http://rogerdudler.github.com/git-guide/>

<http://www.eecs.harvard.edu/~cduan/technical/git/>

**References**

<http://www.eecs.harvard.edu/~cduan/technical/git/> 🡨 The biggest help I’ve had in understanding the basics and underlying system behind git.

<http://rogerdudler.github.com/git-guide/> 🡨 A great and simple guide to git.

<http://help.github.com> 🡨 Obviously