

# *Git Working!*

SESA

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In this tutorial, we'll be covering the basics of git so that you'll be able to use it when working on assignments throughout your degree. We'll be assuming you're on a lab computer running Ubuntu, but if you've gotten git working on a personal device that you are more comfortable with, use that.

It's recommended that you type out all commands provided rather than copying and pasting them. This is to help you become more familiar with a terminal and get fast at typing stuff out.

To begin with, you're going to want to open up a terminal window and your favourite text editor.

## *Getting Started*

### *Initial Setup*

Before we do anything, let's get git setup.

```
$ git config --global user.username "Your Name"
$ git config --global user.email "your_email@example.com"
```

### *First Steps*

First, you're going to want to move into your workspace. Then, create a new directory for the repo. Finally, initialise the git repository.

```
$ cd ~/workspace
$ mkdir git-tutorial
$ cd git-tutorial
$ git init # Initialise the directory as a git repo
$ git status # Check the status of the repo
```

Note down what's changed in the directory, what does git status show?

### *Making History*

We'll need to make something into the repo for it to be useful at all. Make anything you want really, but here's something<sup>1</sup>. Add the file(s) you created to the repo and save it's state with a commit. It's a good idea to check the state of the repo along the way.

```
$ touch hello_world.py # Create a file called hello_world.py
$ vim hello_world.py # Use your favourite editor here.
$ python hello_world.py
```

```
#!/usr/bin/env python
print 'Hello, world!'
```

```

Hello, world!
$ git status
$ git add . # Add all files to the repo for tracking
$ git status
$ git commit -m 'hello world' # Save the state of the repo.
$ git status

```

What's printed out by git status? What is an untracked file? Do you know what the . is when adding files? What does the -m option of git commit do?

## *Branching Out*

It's time to add an 'experimental' feature to our code. We don't want to break master if we make a mistake so we'll be working on a different branch.

### *Creating a Branch*

Let's create a branch for experimenting on. We'll call it develop as this is the industry standard.

```

$ git branch develop # Create the new branch
$ git branch # List the branches in the repo
$ git checkout develop # Checkout the newly created branch
$ git status

```

Notice what the current branch is from the output of git branch. Can you tell what branch you're on using git status?

### *More Changes*

Time to add that 'experimental' feature. Go ahead and change the code to produce something different<sup>2</sup>.

```

$ vim hello_world.py
$ python hello_world.py
Hello, world!
Hello, Nasser!
$ git status
$ git diff # See what's changed from the last commit
$ git commit -am 'experimenting'
$ git status

```

```

#!/usr/bin/env python

print 'Hello, world'
print 'Hello, Nasser!'

```

What was shown by git diff? Do you understand what it means?

### *Checking the Log*

Time to review what we've done to the repo. This is achieved by having a look at the log that git keeps automatically.

```
$ git log
```

### *Merging changes*

Everything seems to be working fine so we haven't broken anything. Let's merge the changes we made back into the master branch.

```
$ git checkout master # Move back to the master branch.
$ git log # Display a log of commits in the repo.
$ python hello_world.py
Hello, world!
$ git merge develop # Merge changes from develop into master.
$ python hello_world.py
Hello, world!
Hello, Nasser!
$ git log
```

Notice how after you checkout the master branch, changes you made in the develop branch aren't there until you merge. What does Fast-forward mean in the output of git merge?

### *Github*

Time to get your code online! We're going to set up a remote repository and push your changes up to it.

Head on over to <https://github.com> and create an account if you don't have one already. This should be straight forward, but if you have any issues ask a tutor.

For image guides on how to navigate Github, please see the appendix.

### *Creating an SSH Key*

To communicate with GitHub you can either use HTTPS or SSH. HTTPS requires no setup but you will need to enter your username and password every time to make a request to GitHub. SSH on the otherhand uses a public-private key pair to authenticate automatically, however you need to provide GitHub with your public key. We're not going to get into cryptography here, just cover setting it up.

```
$ # Press enter whenever prompted to use the defaults.
$ ssh-keygen -t rsa -C "{YOUR_EMAIL}"
Generating public/private rsa key pair.
Enter file in which to save the key ({HOME_DIR_PATH}/.ssh/id_rsa):
Enter passphrase (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in {HOME_DIR_PATH}/.ssh/id_rsa.
Your public key has been saved in {HOME_DIR_PATH}/.ssh/id_rsa.pub.
The key fingerprint is:
SHA256:ZkDND3fclVgGz6eVozHwsbZlPZxwtQHDiWUnSVponFE {YOUR_EMAIL}
The key's randomart image is:
{OMITTED}
```

Now you'll need to copy the public key that was generated and saved in `{HOME_DIR_PATH}/.ssh/id_rsa.pub`. Open the file and copy the contents.

Head to GitHub and navigate to personal settings. On the left will "SSH Keys", click on that. Click "Add SSH key". Give the key a title and paste in the key. Click "Add key".

You'll now be able to pull and push to GitHub from the terminal without entering credentials.

### *Creating a Remote Repo*

First, we need to create a remote repo on github to store a copy of our repo in. You'll need to come up with a cool name for the repo or just use `git-tutorial`, either will do.

Github will provide instructions on how to get your code up there, but we'll still cover it here.

I'll be using `https://github.com/drpotato/git-tutorial` as the remote repo in the example.

```
$ # Add a link a remote repository to the local one.
$ git remote add origin git@github.com:drpotato/git-tutorial.git
$ git push --set-upstream --all # Push changes to the remote repo.
```

What do the `--set-upstream` and `--all` flags for `git push` do?

## Forking

Pick a friend or random stranger (or use Chris' repo <https://github.com/drpotato/git-tutorial>) and fork their repository.

Once forked, go up a directory and clone your new repo and make some changes <sup>3</sup>. Be sure to checkout develop, just in case you break the build. When you're done, push the changes up to github.

```
$ cd ..
$ # Download a copy of the remote repository
$ git clone git@github.com:drpotato/git-tutorial.git
$ cd git-tutorial
$ git checkout develop # By default it will be on master.
$ vim hello_world.py
$ python hello_world.py
Hello, world!
Hello, Github!
$ git status
$ git diff
$ git commit -am 'changed the hello message'
$ git push origin develop
```

```
#!/usr/bin/env python
```

```
print 'Hello, world'
print 'Hello, Github!'
```

What does git push origin develop do exactly? How is it different from git push -all?

## Pull Request

Now we're going to submit a pull request. This is asking the original repo's owner to go over changes we've made and merge them in if they're acceptable.

Navigate to your forked github repo on <https://github.com>. Click the 'Compare, review and create a pull request' button. This will take you to a page to set up a pull request before you fire it off to the owner of the original repo.

Get your partner to accept your pull request and discuss the changes you made with each other.

## Appendix

Create a repo on Github.

Search GitHub

Explore Gist Blog Help

drpotato

Contributions Repositories Public activity

**Popular repositories**

- pigvane** This game was created during Global G... 3 ★
- git-lecture** A presentation for SOFTENG 206 on Git... 1 ★
- overlord-xenu** A game about Prehistory, Scientology, t... 1 ★
- Contacts** SOFTENG206 Project Repo 0 ★
- dml** Don't Mind It. Silly web app. Please igno... 0 ★

**Repositories contributed to**

- youngshand/Nudge-PHP** This is a legacy CodeIgnitor version of n... 0 ★
- youngshand/crane** 0 ★
- youngshand/Nudge-Cake** New Nudge boilerplate powered by Ca... 0 ★
- robert-king/studentcourseview** best way to find courses 0 ★
- ausesa/phaser-bootstrap** Bootstrap for a game using the Phaser f... 1 ★

**Chris Morgan**  
drpotato

Joined on Feb 27, 2013

11 Followers 20 Starred 10 Following

**Organizations**

**Contributions**

Summary of Pull Requests, issues opened, and commits. [Learn more.](#)

Year of contributions: **1,008 total** (Aug 24 2013 - Aug 24 2014)

Longest streak: **6 days** (September 12 - September 17)

Current streak: **0 days** (Rock - Hard Place)

Fork a repo

Search This repository

Explore Gist Blog Help

drpotato

Unwatch 1 Unstar 1 Fork 1

**Description**

Short description of this repository

**Website**

Website for this repository (optional)

Save or Cancel

5 commits 2 branches 1 release 1 contributor

branch: master git-tutorial / +

updated gitignore

drpotato authored 23 hours ago latest commit fb459ffb0c

File	Change	Time
img	added images	23 hours ago
.gitignore	updated gitignore	23 hours ago
Handout.tex	added images	23 hours ago

We recommend adding a README to this repository to help give people an overview of your project. [Add a README](#)

**Code**

Issues 0

Pull Requests 0

Wiki

Pulse

Graphs

Settings

SSH clone URL

git@github.com:ausea:

You can clone with HTTPS, SSH, or Subversion.

Clone in Desktop

Download ZIP

Start a pull request.

The screenshot shows the GitHub repository page for **drpotato / oh-my-zsh**, which is forked from **robbyrussell/oh-my-zsh**. The repository statistics show 1,986 commits, 3 branches, 0 releases, and 485 contributors. A red arrow points to the **Compare** button (a green icon with a branch symbol) in the repository header.

Clicking **Compare** leads to a comparison page. At the top, it shows **branch: master** and **oh-my-zsh / +**. Below this, it indicates **0 commits ahead, 686 commits behind robbyrussell:master**. A table lists the differences between the branches:

File	Description	Time
custom	Moved misplaced plugins.	11 months ago
lib	Merge pull request #1773 from essembel/master	a year ago
log	Adding a file into log/ so that we have a log file to record history to	5 years ago
plugins	Fix bad ps syntax in ssh-agent plugin	10 months ago
templates	Fixed comments in zshrc.zsh-template about disabling auto updates.	a year ago
themes	fixed merge conflict	9 days ago
tools	Display right prompt in theme chooser	a year ago
.gitignore	gitignore fix for custom folder.	11 months ago
MIT-LICENSE.txt	Adding MIT-LICENSE Closes #655	2 years ago
README.textile	Logo draft 1...	a year ago
oh-my-zsh.sh	Create the zcompdump based on version and host	a year ago

On the right sidebar, there are links for **Code**, **Pull Requests** (0), **Wiki**, **Pulse**, **Graphs**, and **Settings**. Below these is the **SSH clone URL** and a **Clone in Desktop** button.

At the bottom of the comparison page, there is a yellow box with the text **Create pull request** and **Discuss and review the changes in this comparison with others.** A red arrow points to the **Create pull request** button.

Below the comparison page, the **Commits** section shows a list of commits from the forked repository:

- Chris Morgan** added personal theme (ec88cd0)
- drpotato** changed text color of dir prompt (1e88d55)
- drpotato** changed prompt status colours and user name display (eb0fa83)
- drpotato** made prompt less hard coded (83ca4d5)
- drpotato** fixed merge conflict (e9d2361)