

# **Git & Github 101**

Version control and you.

Why use version control?

# Backup and Restore

- Files are saved as their edited.
- Jump back to a specific change in time.
- Browse by commit, branch, or code change.

# Synchronization

- Share files and stay up-to-date.
- Keep up with multiple developers at the same time.

# Undo

- Throw away a small change by just reverting to the last “good” version.
- If you made a mistake a long time ago, jump back and fix it.

# History

- Track the history of a set of files.
- See the entire commit history from everyone.



# Sandboxing

- If you want to make a radical change to your code base, just create another branch.
- When you're ready, just merge it into the master branch.

# What is Git?



# Git?

- Git is a *distributed* version control system.
- It allows for easy collaboration and version control.
- It was created in 2005 by Linus Torvald for development on Linux. Today, it is one of the most popular versioning systems out there.

# How does Git work?

## **Repositories!**

- It holds the history of all changes.
- In a general sense, the repo is a directory.
- You use Git through a CLI (Windows Command Prompt, Terminal, et cetera)

# How would I use Git?

- Collaborate with others.
- Get the correct solution for a problem.
- Have your work corrected.
- Make your work available to the world!

# How do I use Git?

# The Clone Wars

To get the code and history of any repository, you *clone* it.

```
git clone git://github.com/eturk/jack
```

*git init } for new repo*



# History of the World, Part I

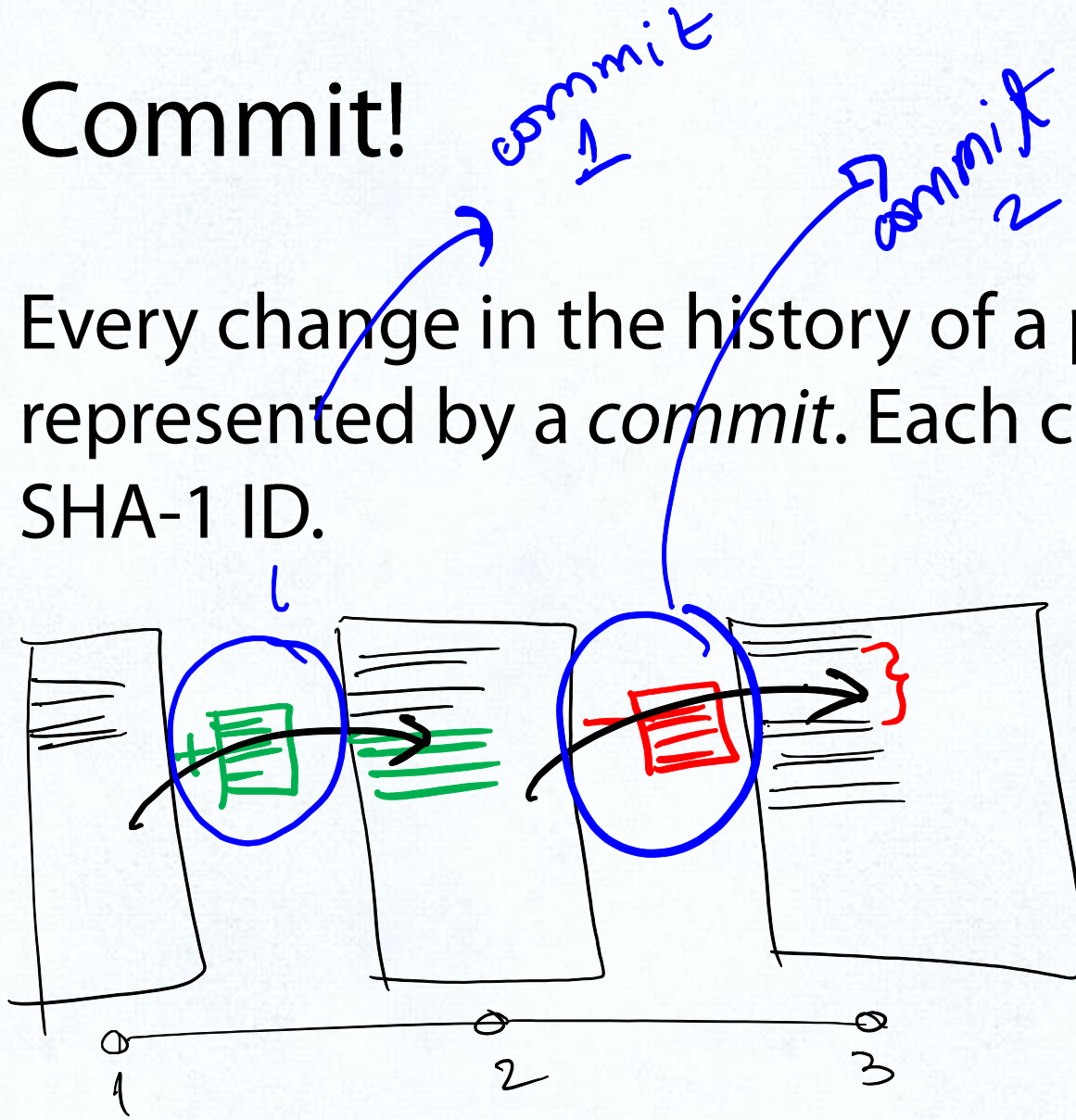
To see the history of any repository, you see the *log* of it.

```
git log
```



# Commit!

Every change in the history of a project is represented by a *commit*. Each commit has a SHA-1 ID.



# Branches

- A *branch* is a different version of the same project.
- You use a branch for keeping some code separate from the main branch (usually called “master”).
  - For example, I use the branch “stable” to differentiate between my development (“master”) and my code that is ready for use (“stable”).

# Branches

You can see the current branch you're using.

```
git branch
```

And change the current branch.

```
git checkout foobar
```

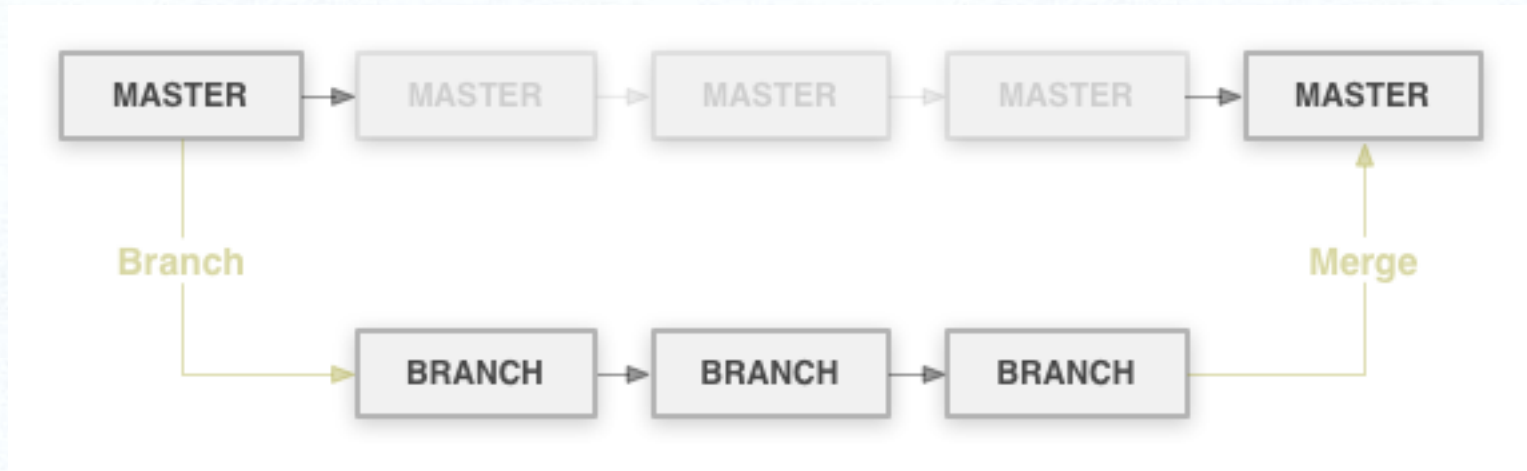
# Merging

- Once you've isolated a branch, you'll want to incorporate those changes back into the main branch. You want to select the branch you want to merge into and specify the branch you're merging from.

```
git checkout stable
```

```
git merge master
```

# Branches & Merging





# Branches & Merging

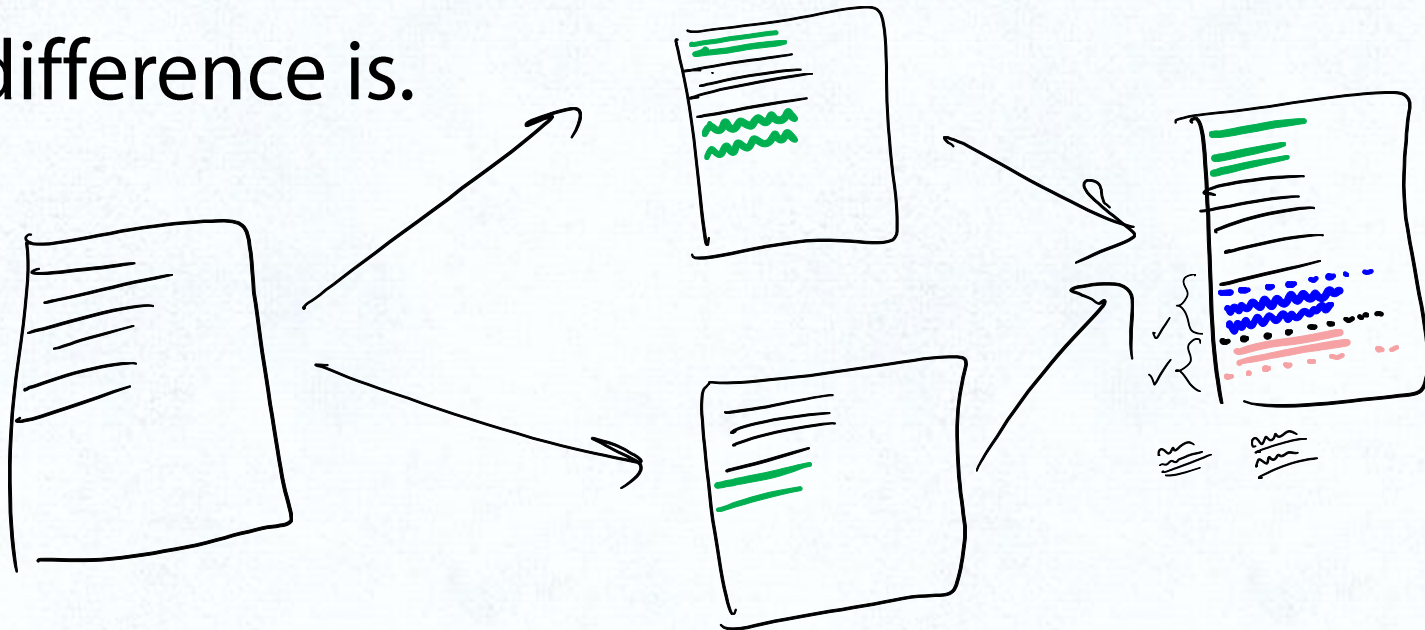
- When you merge, Git will show you a *diff*.
- A diff is the difference between the current code and the code you want to merge in.

```
git diff
```



# The Downfall of the Magical Merge

- When the same block of code is edited in two branches, Git doesn't know how to merge.
- Instead, it'll give us a "merge conflict" error and insert markers in the file where the difference is.



# The Downfall of the Magical Merge

<<<<<<< HEAD

Many Hello World Examples

=====

Hello World Lang Examples

>>>>>>> fix\_readme

This project has examples of hello world in nearly every programming language.

# The Downfall of the Magical Merge

- What do I do?!
  - Resolve it manually by changing the file to the correct code. Remove the markers and re-add it with `git add`.
  - Undo the changes on the current branch by using...

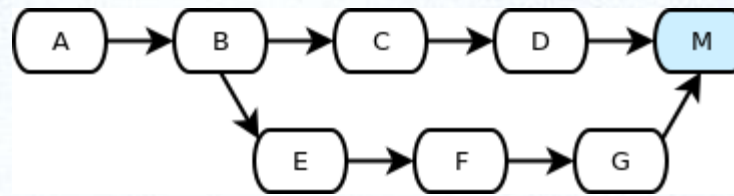
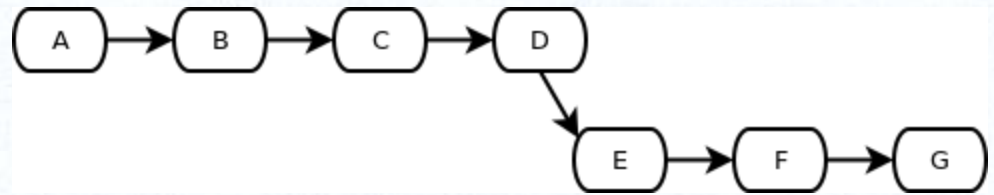
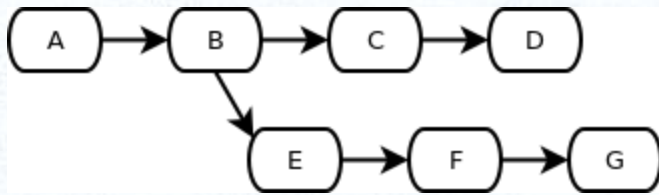
# Stash to the rescue!

- If you have a merge conflict, using *stash* will throw away the changes to the current branch and allow you to merge.

```
git stash
```

# All Your Rebase Are Belong to Us

- Instead of merging with last commit, you use the latest commit.





# Push & Pull

- To move your changes to a remote repository (a.k.a. GitHub), you *push* the changes.

```
git push [remote] [branch]
```

- To get the latest changes to a remote repository, you *pull* or *fetch* the changes.

```
git pull [remote] [branch]
```



# Example Workflow

(make some changes)

```
git add .
```

```
git rm some/unneeded/file
```

```
git commit -m 'Made some changes,  
removed an unneeded file.'
```

```
git push origin master
```

# Example Workflow

```
git checkout master  
(make some changes)
```

```
git checkout stable
```

```
git merge master
```

```
git push origin stable
```

# Best Practices

- **Commit Often**

- When writing a school paper, you save your document often. The same applies to Git.

- **Pull Often**

- Having the latest version of the code will cut down on the amount of times you have merge conflicts.

# Collaboration with Git

You're working on a project called *HelloWorld* with Joe & Bob.

- Everyone has their own repository on their computer and hosted on the Internet.
- Your online repository is the official repository. Joe and Bob's are for development (so when someone wants to use *HelloWorld*, they would get the code from your repository).

# Collaboration with Git

- Joe's making a new feature. He would work on it and push to his online (or "remote") repository.
- When you're satisfied that it works, you'd incorporate it into the main repository by "pulling in" his code into a new branch on the remote repository.
- You'd then merge the new branch into the main branch.
- Then, Bob would run `git pull` on his computer's (or "local") repository to get the latest code.

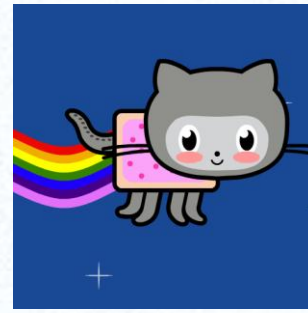
**Remember, commit and pull often!**



# Where do I host online?

- For the longest time, <http://repo.or.cz> has been the standard. Until...

# GitHub



Founded in 2008 by Chris Wanstrath, PJ Hyett, and Tom Preston-Warner, it has grown to 1 million users and over 2 million active repositories.

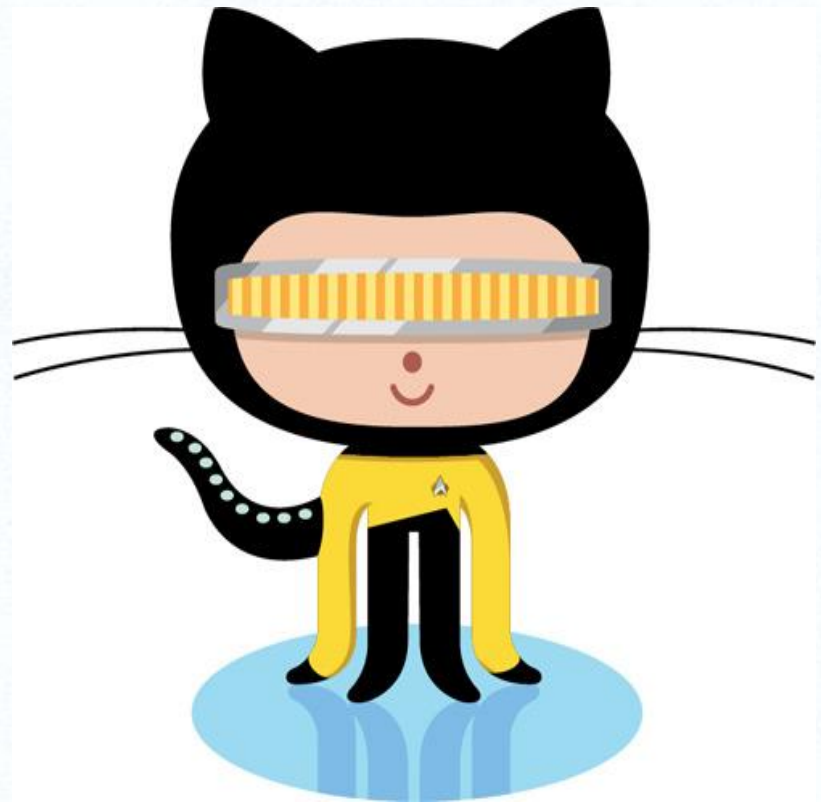


# The Slide of Features™

- Browse code online with syntax highlighting.
- View file history.
- Blame and annotations (view who made changes when and where).
- Online editor.
- Git-powered Wikis.
- Integrated issue tracking, with milestones, labels, search.
- Code Review
  - Pull Request = Code + Issue + Comments
- Comments (comment on commits, files, or even specific lines).
- Network graph (shows all forks).
- Compare view (see differences in commits)
- Community
  - Watch repositories and users.
  - Profiles
  - Explore!

# Who Uses GitHub?

- Linus Torvald and the Linux kernel
- Twitter
- Facebook
- Rackspace
- Yahoo!
- Shopify
- EMI
- Six Apart
- Sun/Oracle
- Node.js
- Apache





# Fork this!

- On GitHub, you can *fork* repositories.
- This will give you your own repository of the code. Clone it, make some changes, and push to your repository.
- Then, on the main repository (the owner's), make a *Pull Request*.



# Pull Requests

- Pull Requests alert the project's owner of your changes.
- You are requesting them to merge your changes into the project.
- These can be attached to *Issues*.
- Pull Requests = Code Review

# Issues

- Issues are attached to a project.
- If you see something is not working with a project, create an issue. If you want a feature, create an issue.
- Keep track of what you need to do.
- Add Labels and Milestones.
- Issues = Discussion

# Gists

- A Gist is an easy way to share code snippets and pastes with others.
- They are Git repositories, so they are versioned, forkable, and you can use them like any other Git repository.

# Futher Reading

- Git Tutorial <http://coo.ly/smi>
- Git Reference <http://coo.ly/KDJ>
- Version Control for Designers  
<http://coo.ly/vvJ>
- Roger Dudler's Git Guide <http://coo.ly/DwW>

