# git + github

SOCIAL CODING

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Maier Lab

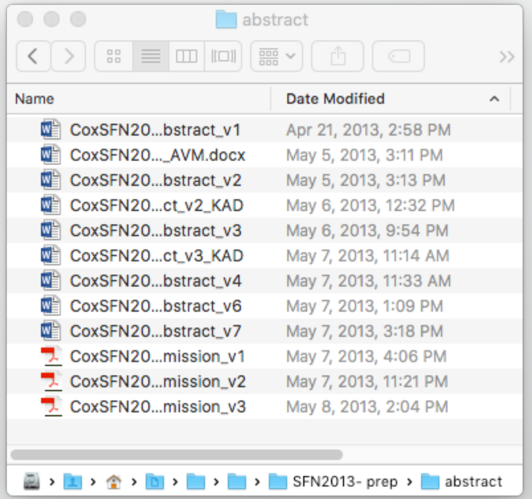
## Agenda

- Review of Git
  - 6 slides you’ve seen before
- Collaborating with Git
  - Some review
  - Examples from my own experience
  - **A “model workflow”**
    - **Gitflow**

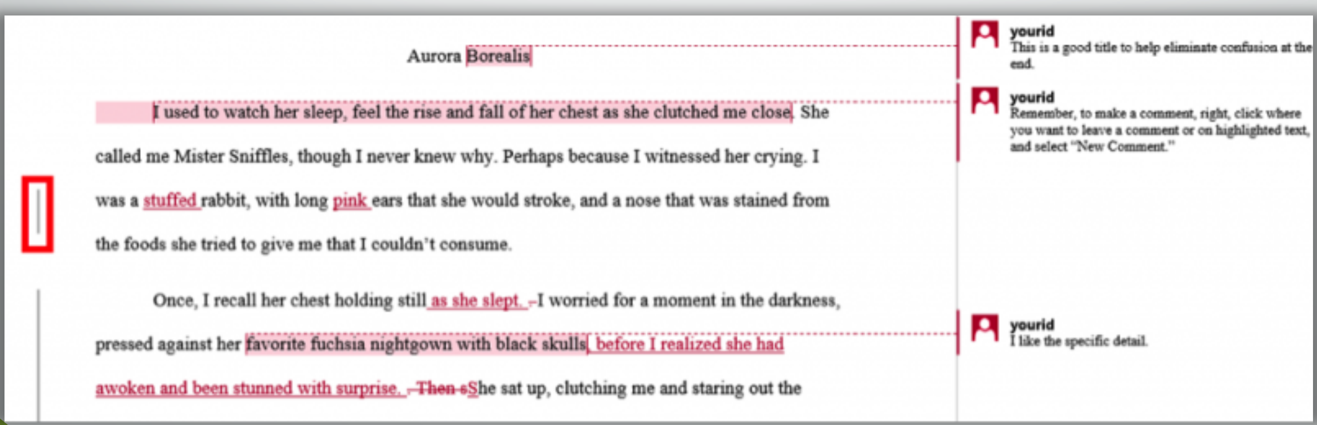
# What is Git?

*version control software*

- Simply, **version control is a way of logging changes** to a file
  - ***What*** was changed
  - ***When*** it was changed
  - ***Who*** changed it
- A lot of us already do this!



| Name | Date Modified |
|---|---|
| CoxSFN20...bstract_v1 | Apr 21, 2013, 2:58 PM |
| CoxSFN20..._AVM.docx | May 5, 2013, 3:11 PM |
| CoxSFN20...bstract_v2 | May 5, 2013, 3:13 PM |
| CoxSFN20...ct_v2_KAD | May 6, 2013, 12:32 PM |
| CoxSFN20...bstract_v3 | May 6, 2013, 9:54 PM |
| CoxSFN20...ct_v3_KAD | May 7, 2013, 11:14 AM |
| CoxSFN20...bstract_v4 | May 7, 2013, 11:33 AM |
| CoxSFN20...bstract_v6 | May 7, 2013, 1:09 PM |
| CoxSFN20...bstract_v7 | May 7, 2013, 3:18 PM |
| CoxSFN20...mission_v1 | May 7, 2013, 4:06 PM |
| CoxSFN20...mission_v2 | May 7, 2013, 11:21 PM |
| CoxSFN20...mission_v3 | May 8, 2013, 2:04 PM |



Aurora Borealis

I used to watch her sleep, feel the rise and fall of her chest as she clutched me close. She called me Mister Sniffles, though I never knew why. Perhaps because I witnessed her crying. I was a stuffed rabbit, with long pink ears that she would stroke, and a nose that was stained from the foods she tried to give me that I couldn't consume.

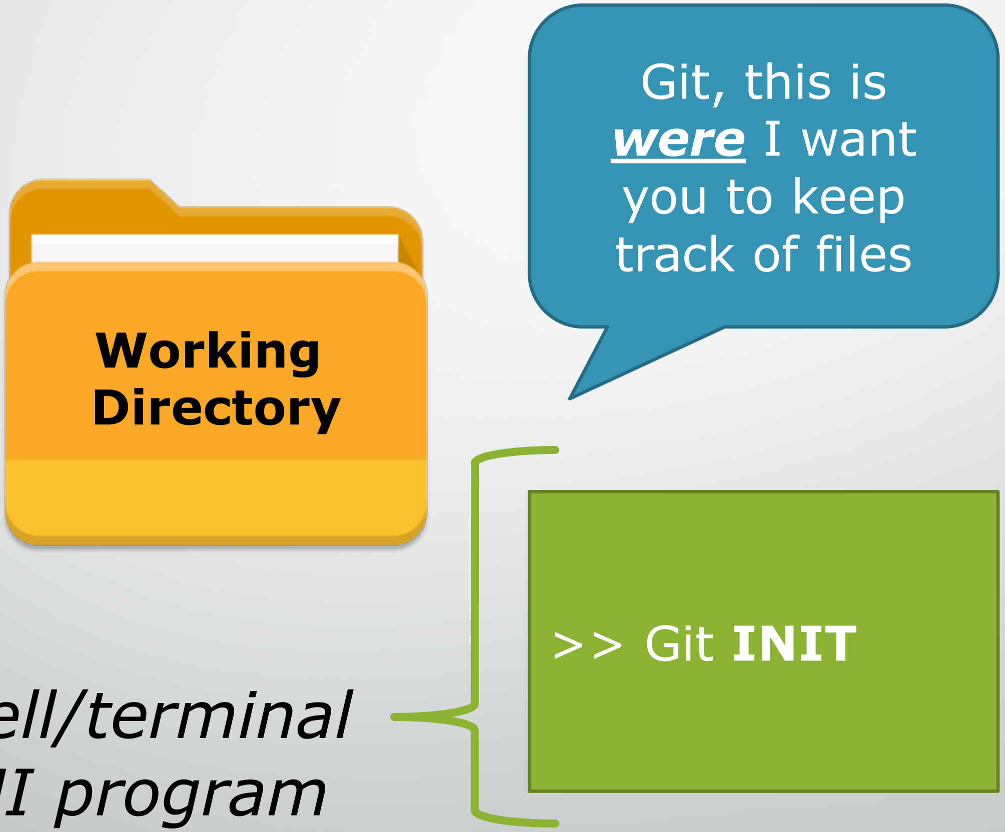
Once, I recall her chest holding still as she slept. -I worried for a moment in the darkness, pressed against her favorite fuchsia nightgown with black skulls before I realized she had awoken and been stunned with surprise. ~~Then s~~She sat up, clutching me and staring out the

**yourid**
This is a good title to help eliminate confusion at the end.

**yourid**
Remember, to make a comment, right, click where you want to leave a comment or on highlighted text, and select "New Comment."

**yourid**
I like the specific detail.

# How does Git work?
## *on a conceptual level*



- *shell/terminal*
- *GUI program*
- *Matalb 2014b+*

# How does Git work?

*on a conceptual level*

Git, this is a ***file*** for which I want you to ***track changes*** into the future

```
>> Git ADD "file"
>> Git COMMIT
```

# How does Git work?

*on a conceptual level*

Git, I ***made changes*** to the file you were tracking.

```
>> Git ADD "file"
>> Git COMMIT
```

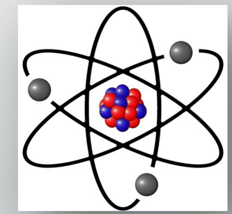
# How does Git work?

*on a conceptual level*

In Git, the process of logging changes
—including adding new files—
involves **2 steps** (i.e., 2 commands):

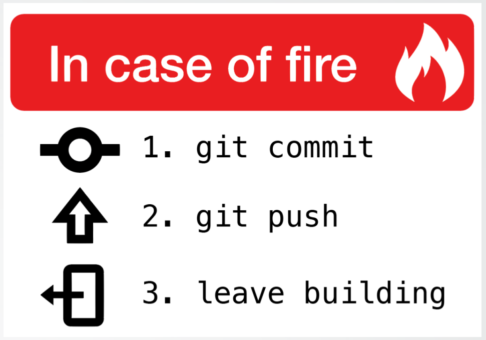
```
>> Git ADD
>> Git COMMIT
```

*"commit"*



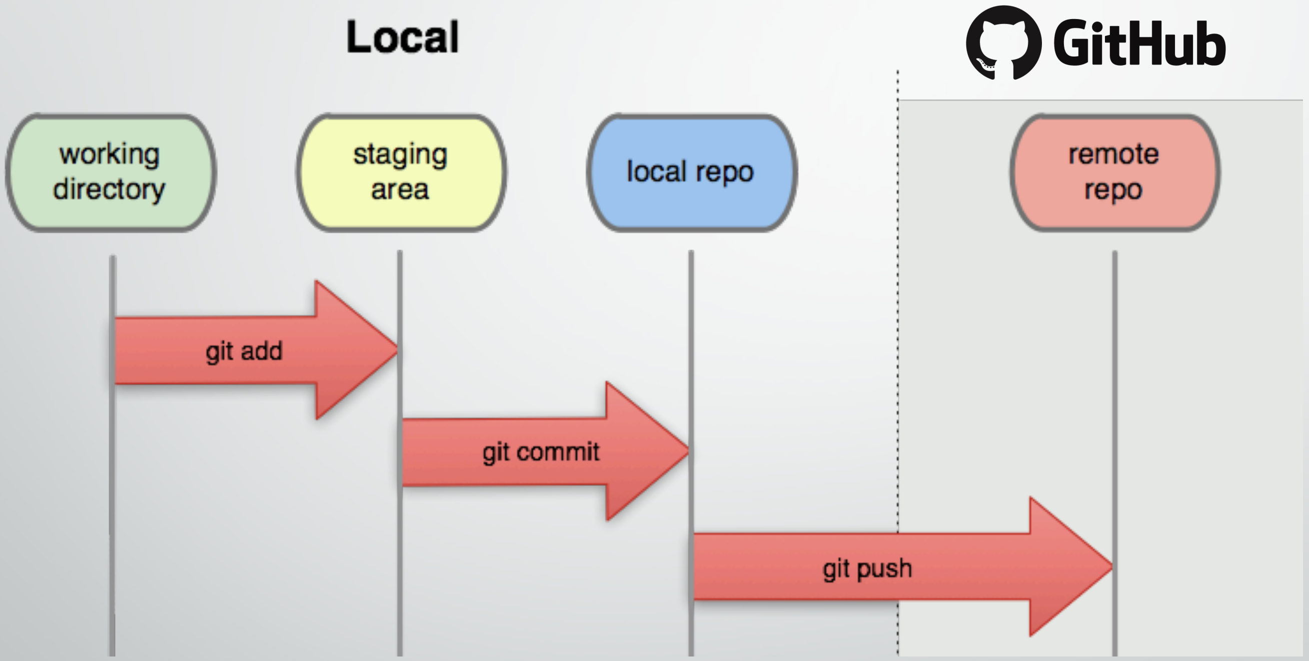
https://www.atlassian.com/git/tutorials/saving-changes

# Basic Git Concepts



In case of fire

1. git commit
2. git push
3. leave building

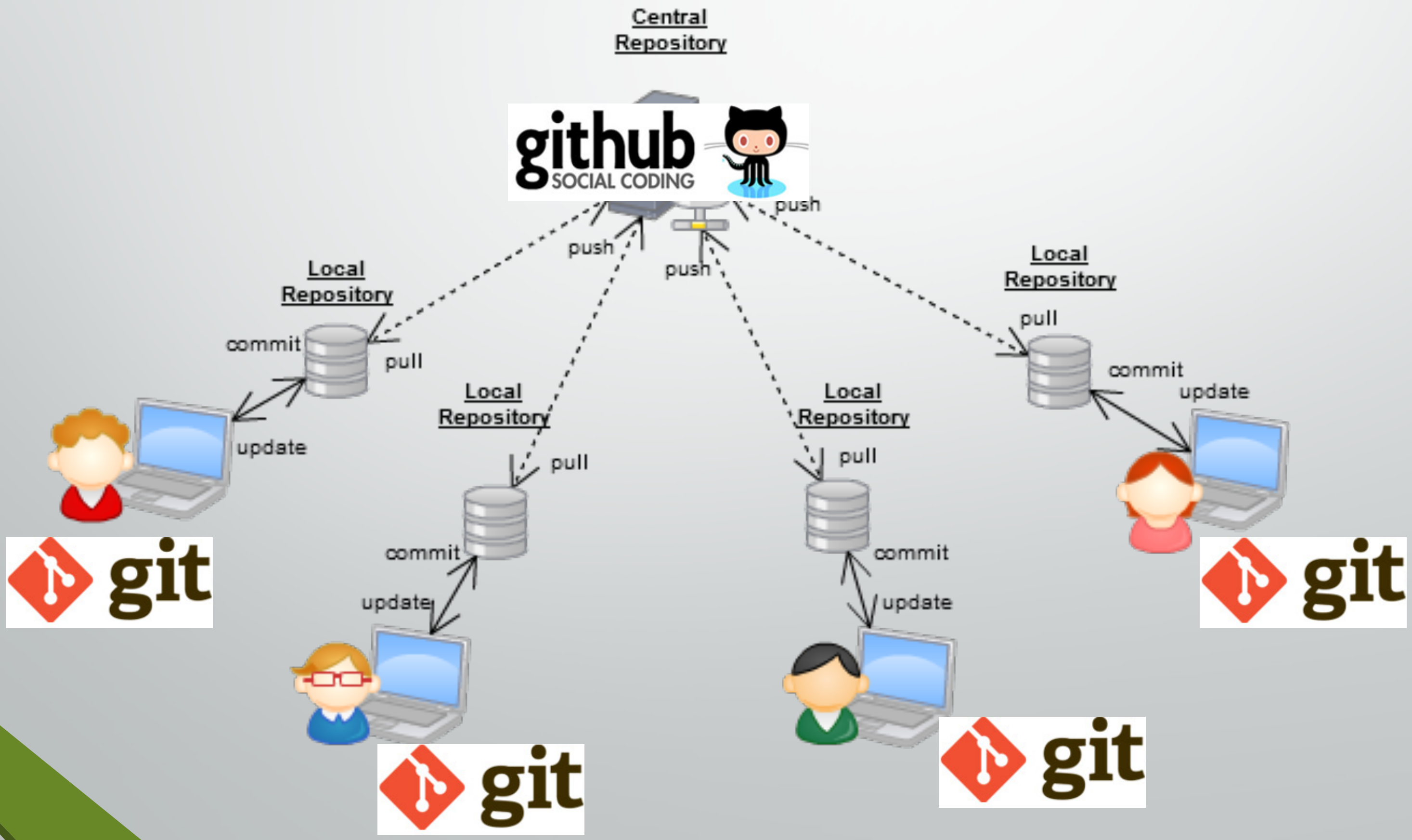


## Basic Git Concepts

- Key instruments:
  - ADD – tells Git that **you have made a change**
  - COMMIT – tells Git to **log changes** with a message
  - PUSH – tells Git to **transfer those changes** to remote
- Commits contain:
  - **A record of changes** (line by line, new items, etc.)
  - **Your notes** (i.e., message) about the change
  - **Date/time/person** making the commit.

# Collaborating with Git

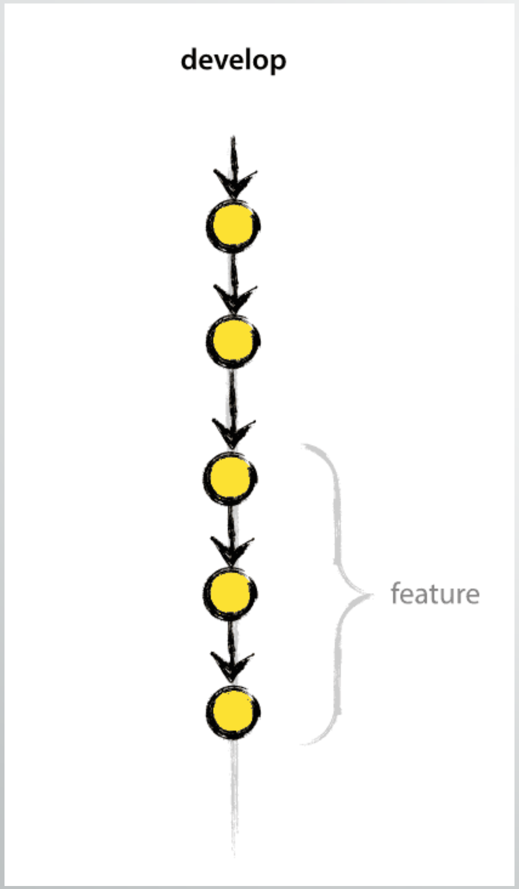
- Commits are the basic "change unit" in Git
- Commits are also the basic unit of collaboration

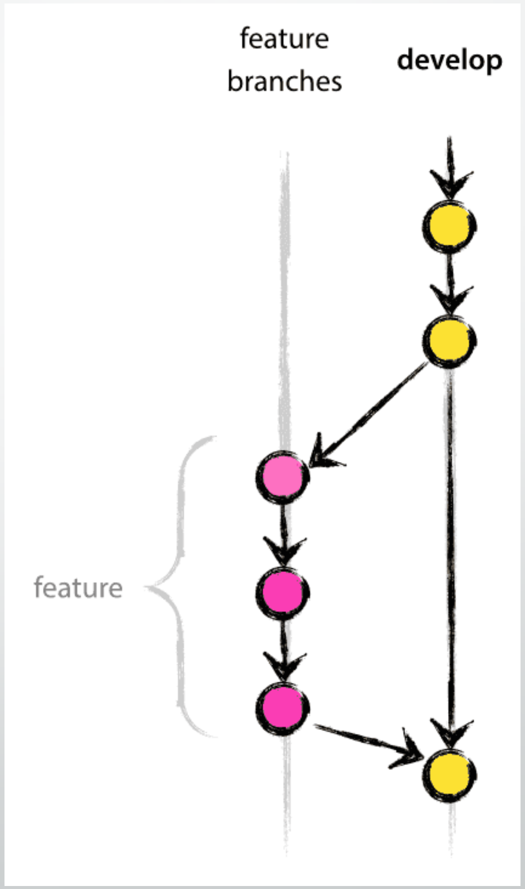


## Collaborating with Git

- Git's key collaboration instruments are:
  - **Branching / Forking**
  - **Merging**

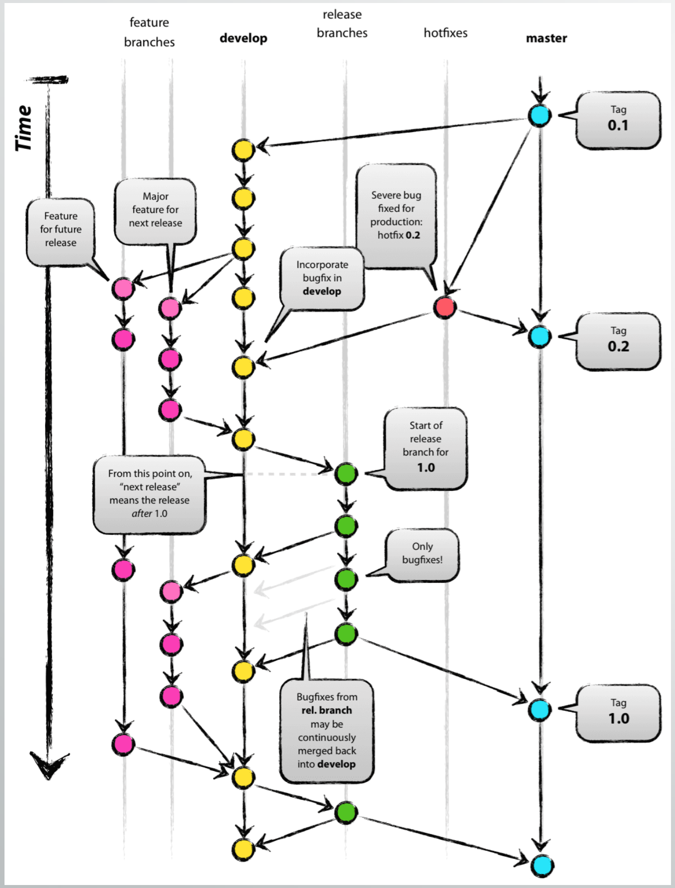
# Collaborating with Git





http://nvie.com/posts/a-successful-git-branching-model/

# Collaborating with Git



feature branches
develop
release branches
hotfixes
master
Time
Tag 0.1
Severe bug fixed for production: hotfix 0.2
Major feature for next release
Feature for future release
Incorporate bugfix in develop
Tag 0.2
Start of release branch for 1.0
From this point on, "next release" means the release after 1.0
Only bugfixes!
Tag 1.0
Bugfixes from rel. branch may be continuously merged back into develop

- Can have **many branches** for different purposes
- Can **switch** between them during development
- Can **push** to a remote repository without effecting other branches
- Eventually, can **merge** back into a main branch (often called the master branch).
- **Forks** allow all the same, but with repositories you don't control

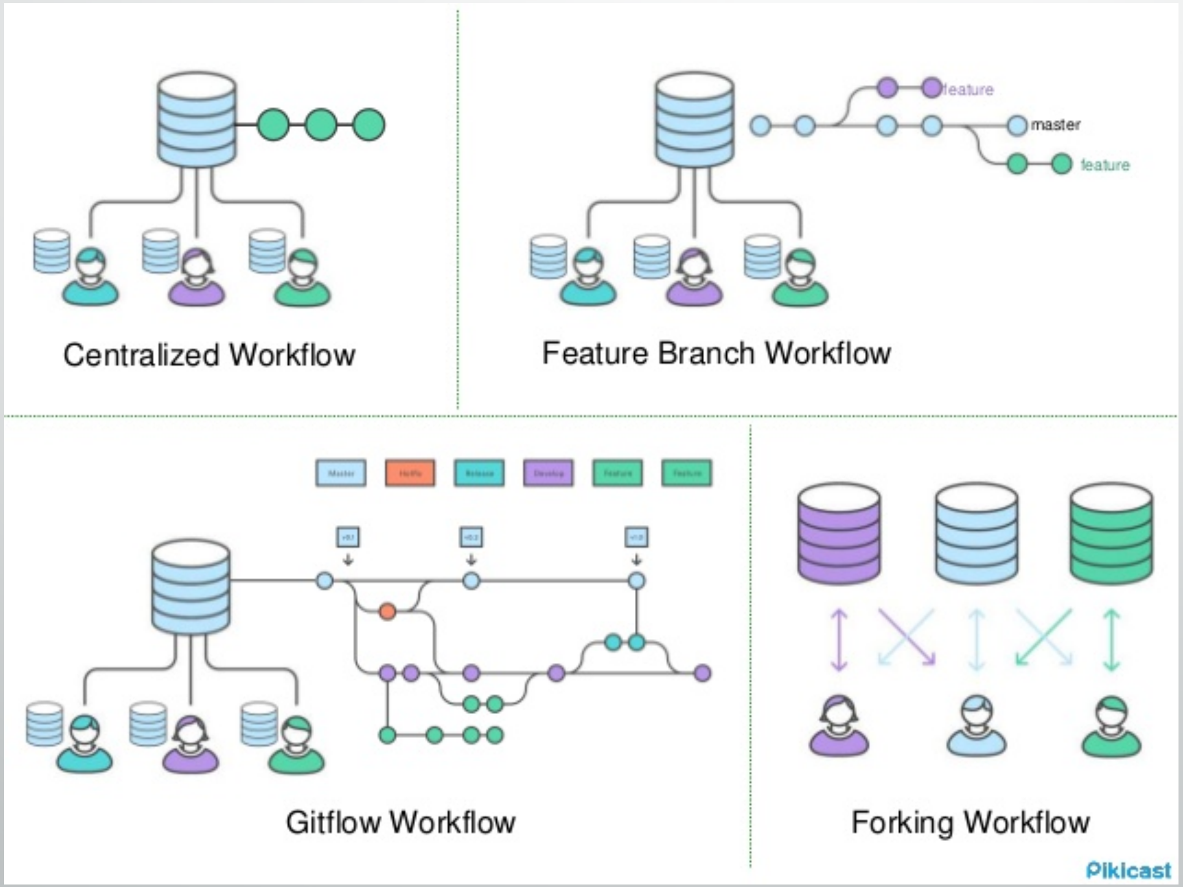
http://nvie.com/posts/a-successful-git-branching-model/

# Collaborating with Git

- **Commits** are the basic unit of Collaboration
- Git's key collaboration instruments are:
  - **Branching / Forking**
  - **Merging**
- Git is intended to be ***extremely flexible*** as a both a source control and collaboration tool
  - In practice, this means that you can setup pretty much whatever type of workflow that you want.

# Working with Git
## *how git helps me do my job*

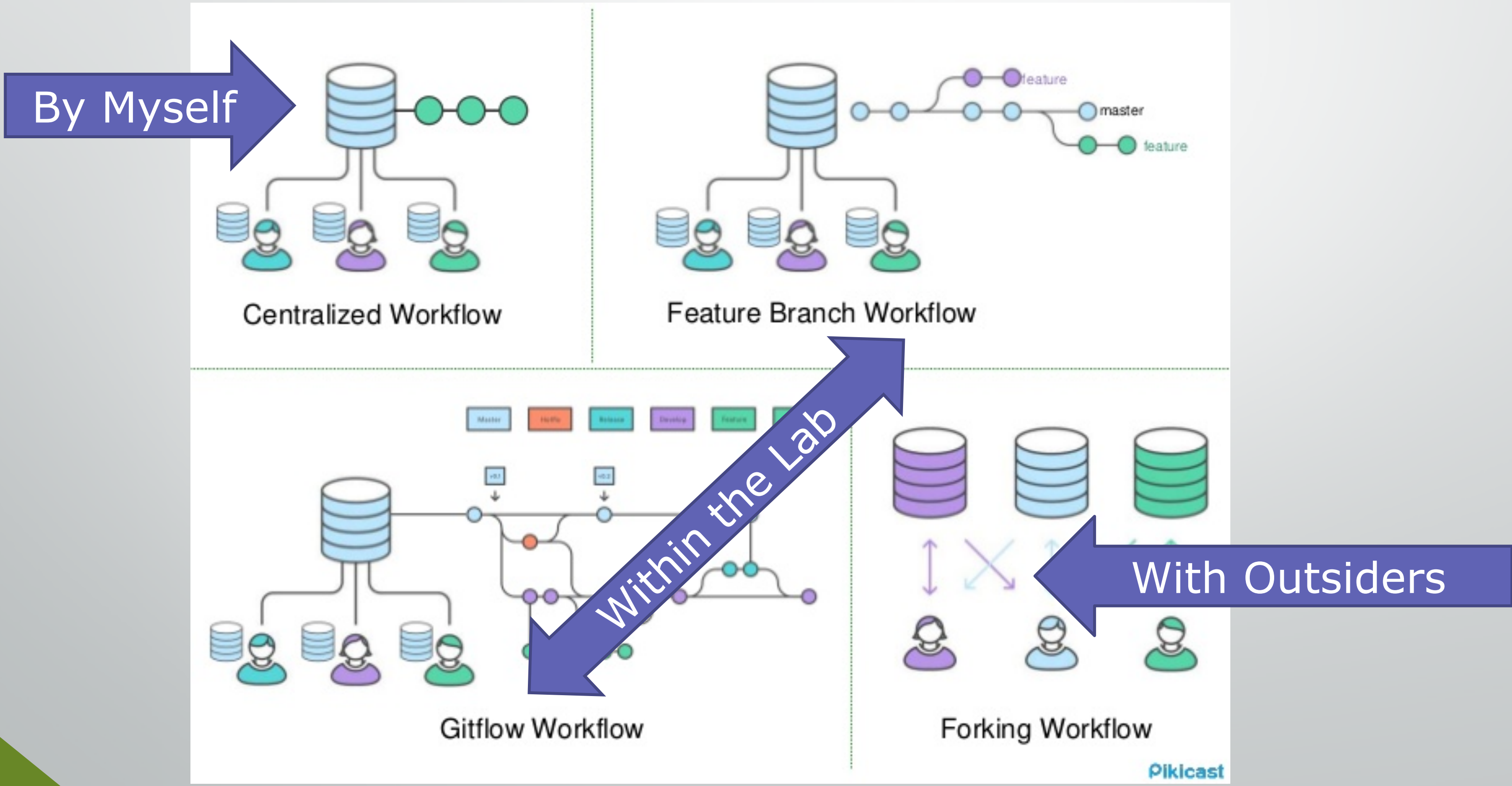
Example Workflows



https://www.atlassian.com/git/tutorials/comparing-workflows

# Working with Git
## *how git helps me do my job*

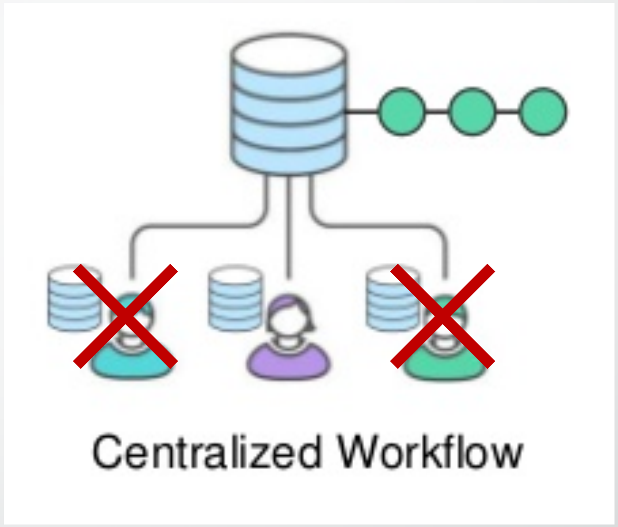
Example Workflows



https://www.atlassian.com/git/tutorials/comparing-workflows

# Case #1: My Analysis Code *Centralized Workflow*

- Matlab code that I have written to analyze data
- Nobody else contributes
- Repository is Private on GitHub

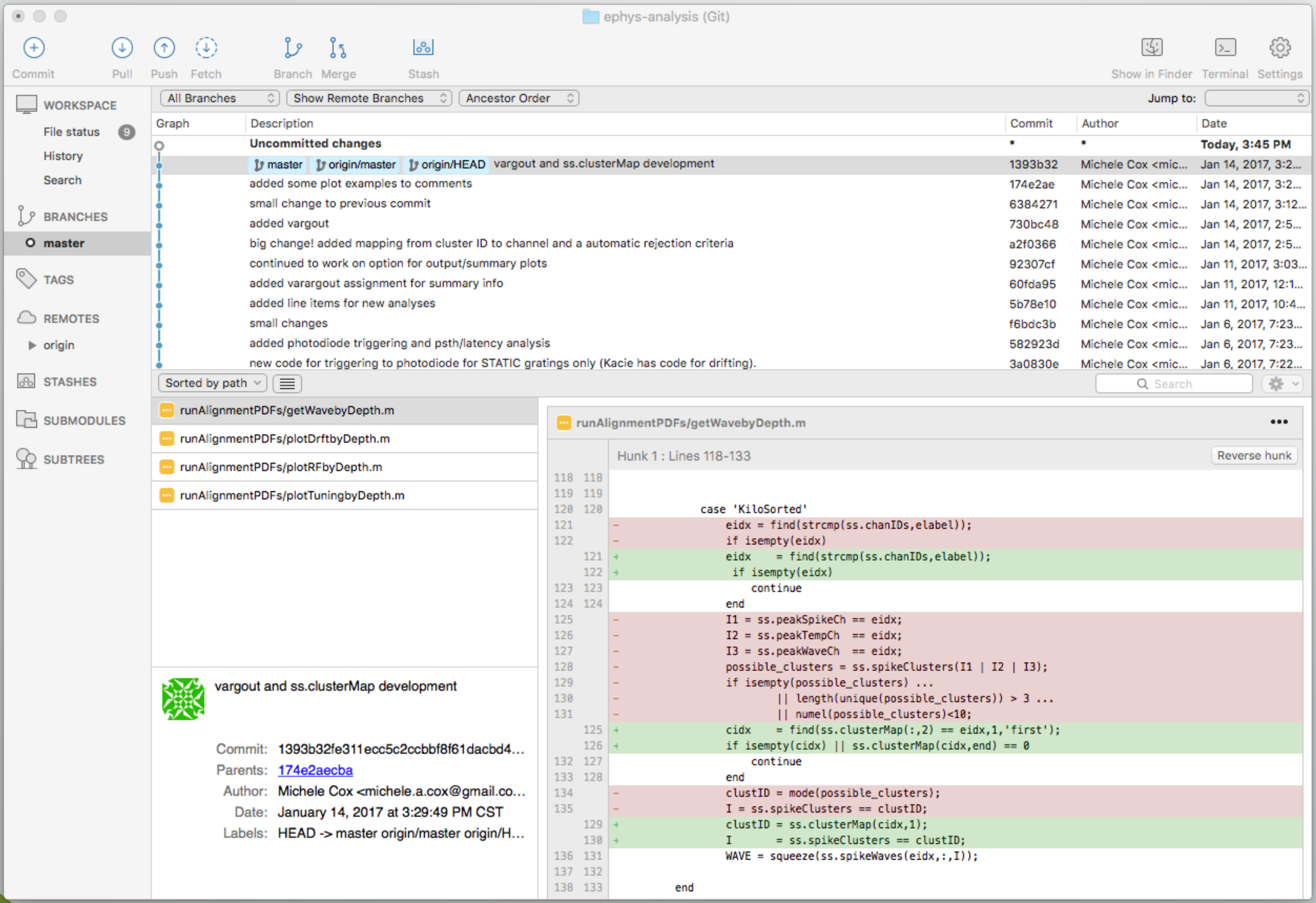


Taking advantage of:

- Git to **record changes** over time.
- GitHub as an **online Backup**

# Case #1: My Analysis Code

## *Centralized Workflow*



| Graph | Description | Commit | Author | Date |
|---|---|---|---|---|
| | **Uncommitted changes** | * | * | **Today, 3:45 PM** |
| | master origin/master origin/HEAD vargout and ss.clusterMap development | 1393b32 | Michele Cox <mic... | Jan 14, 2017, 3:2... |
| | added some plot examples to comments | 174e2ae | Michele Cox <mic... | Jan 14, 2017, 3:2... |
| | small change to previous commit | 6384271 | Michele Cox <mic... | Jan 14, 2017, 3:12... |
| | added vargout | 730bc48 | Michele Cox <mic... | Jan 14, 2017, 2:5... |
| | big change! added mapping from cluster ID to channel and a automatic rejection criteria | a2f0366 | Michele Cox <mic... | Jan 14, 2017, 2:5... |
| | continued to work on option for output/summary plots | 92307cf | Michele Cox <mic... | Jan 11, 2017, 3:03... |
| | added varargout assignment for summary info | 60fda95 | Michele Cox <mic... | Jan 11, 2017, 12:1... |
| | added line items for new analyses | 5b78e10 | Michele Cox <mic... | Jan 11, 2017, 10:4... |
| | small changes | f6bdc3b | Michele Cox <mic... | Jan 6, 2017, 7:23... |
| | added photodiode triggering and psth/latency analysis | 582923d | Michele Cox <mic... | Jan 6, 2017, 7:23... |
| | new code for triggering to photodiode for STATIC gratings only (Kacie has code for drifting). | 3a0830e | Michele Cox <mic... | Jan 6, 2017, 7:22... |

runAlignmentPDFs/getWavebyDepth.m
runAlignmentPDFs/plotDrftbyDepth.m
runAlignmentPDFs/plotRFbyDepth.m
runAlignmentPDFs/plotTuningbyDepth.m

vargout and ss.clusterMap development

Commit: 1393b32fe311ecc5c2ccbbf8f61dacbd4...
Parents: 174e2aecba
Author: Michele Cox <michele.a.cox@gmail.co...
Date: January 14, 2017 at 3:29:49 PM CST
Labels: HEAD -> master origin/master origin/H...

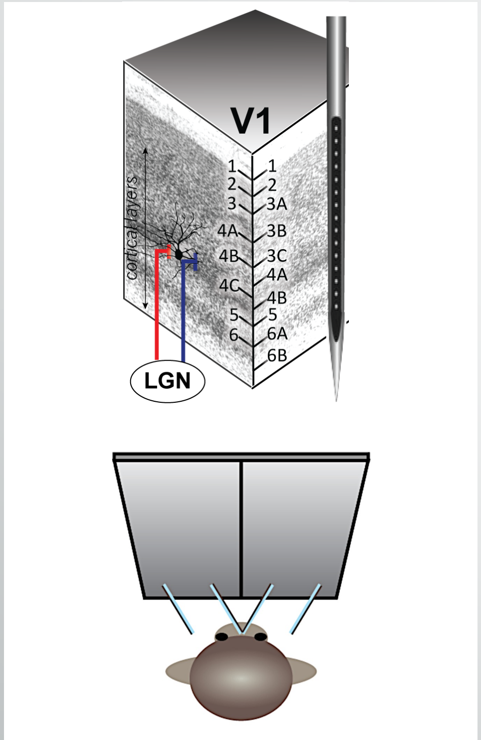
runAlignmentPDFs/getWavebyDepth.m

Hunk 1 : Lines 118-133 Reverse hunk

```
118 118
119 119
120 120              case 'KiloSorted'
121      -               eidx = find(strcmp(ss.chanIDs,elabel));
122      -               if isempty(eidx)
    121  +               eidx    = find(strcmp(ss.chanIDs,elabel));
    122  +                if isempty(eidx)
123 123                      continue
124 124                  end
125      -               I1 = ss.peakSpikeCh == eidx;
126      -               I2 = ss.peakTempCh  == eidx;
127      -               I3 = ss.peakWaveCh  == eidx;
128      -               possible_clusters = ss.spikeClusters(I1 | I2 | I3);
129      -               if isempty(possible_clusters) ...
130      -                       || length(unique(possible_clusters)) > 3 ...
131      -                       || numel(possible_clusters)<10;
    125  +               cidx    = find(ss.clusterMap(:,2) == eidx,1,'first');
    126  +               if isempty(cidx) || ss.clusterMap(cidx,end) == 0
132 127                      continue
133 128                  end
134      -               clustID = mode(possible_clusters);
135      -               I = ss.spikeClusters == clustID;
    129  +               clustID = ss.clusterMap(cidx,1);
    130  +               I       = ss.spikeClusters == clustID;
136 131                WAVE = squeeze(ss.spikeWaves(eidx,:,I));
137 132
138 133          end
```

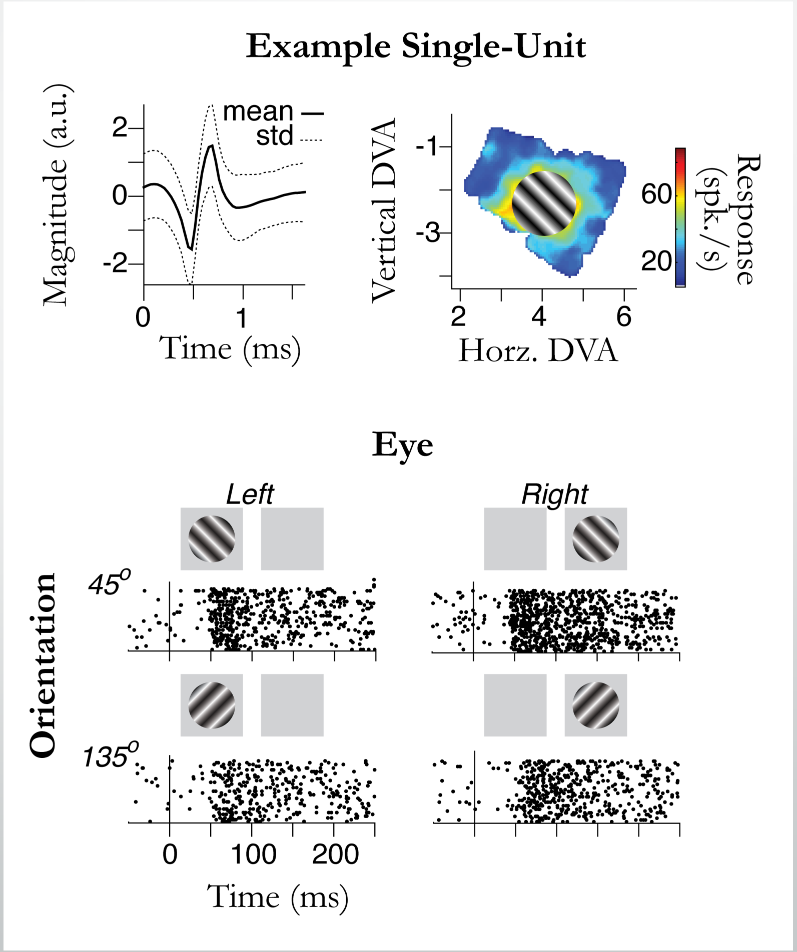
# Case #2: Our Vision Experiments

## *Feature-Branch Workflow*



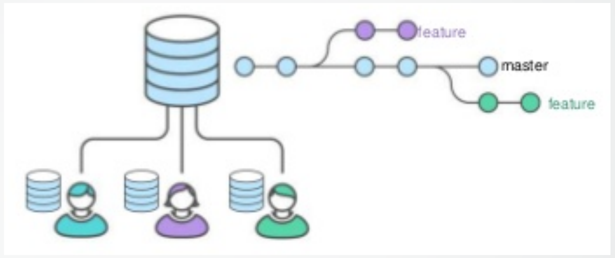
Stimulus Parameters:

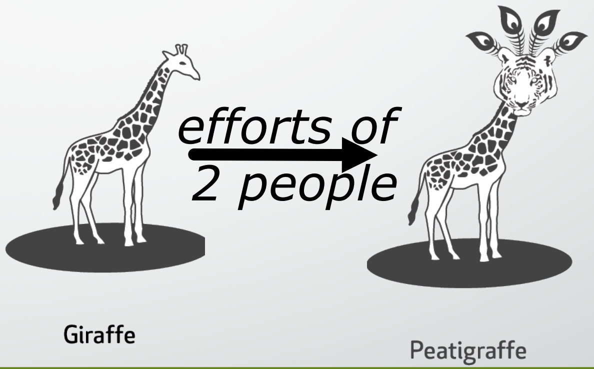
- Eye
- Orientation
- (Contrast)



## Case #2: Our Vision Experiments
## *Feature-Branch Workflow*

- Binocular stimulation suite developed by the Maier Lab
- Kacie Dougherty and I collaborated on code
- Multiple iterations over several months
- Worked on different and sometimes the same features.





Taking advantage of:

- Ability for **multiple people** to coordinate working on a project
- **Branching** and **Merging** for feature development

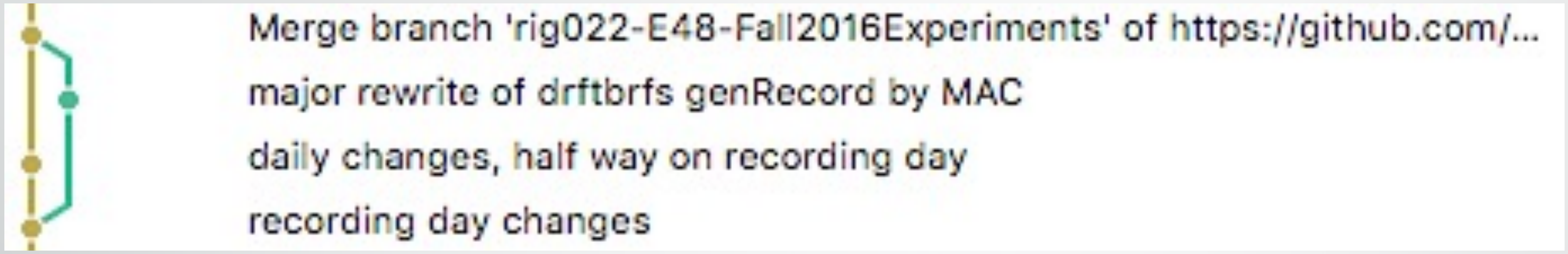
## Case #2: Our Vision Experiments

## *Feature-Branch Workflow*

- Several months into the project, we decided to add motion as a stimulus parameter
  - Static gratings -> drifting gratings
- Kacie took the lead on this
  - Branched the current “stable” version
  - Made changes across many files (10+)
- In the meanwhile, I continued to collect data with the “stable branch”
- When Kacie was done (including testing), she merged her “feature branch” into the “stable branch”.
- On that same day, I was able to pull the update to the “stable branch” and run an experiment with the new code.

## Case #2: Our Vision Experiments

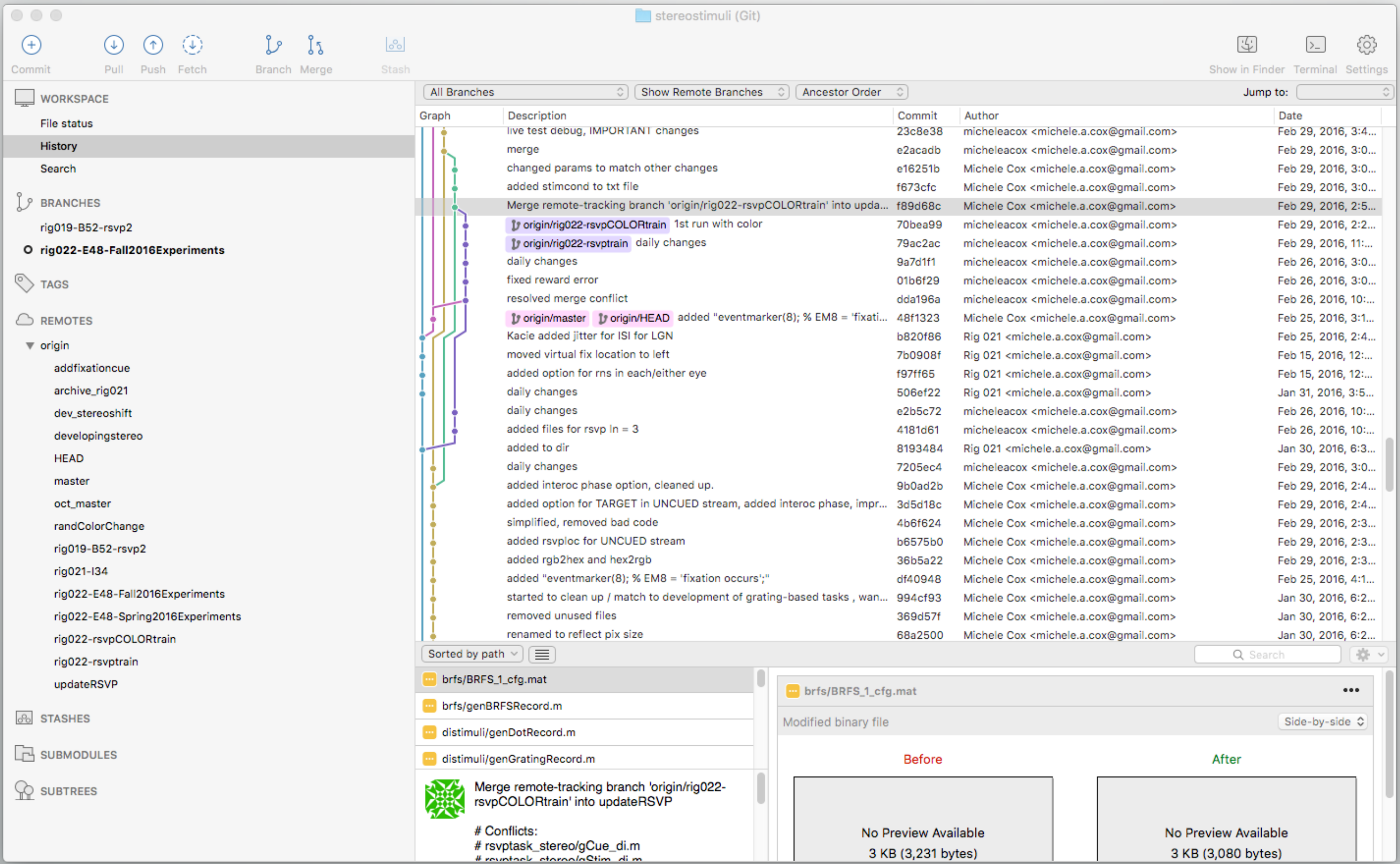
### *Feature-Branch Workflow*



```
Merge branch 'rig022-E48-Fall2016Experiments' of https://github.com/...
major rewrite of drftbrfs genRecord by MAC
daily changes, half way on recording day
recording day changes
```

# Case #2: Our Vision Experiments

## *Feature-Branch Workflow*



WORKSPACE
File status
History
Search

BRANCHES
rig019-B52-rsvp2
**rig022-E48-Fall2016Experiments**

TAGS

REMOTES
origin
addfixationcue
archive_rig021
dev_stereoshift
developingstereo
HEAD
master
oct_master
randColorChange
rig019-B52-rsvp2
rig021-I34
rig022-E48-Fall2016Experiments
rig022-E48-Spring2016Experiments
rig022-rsvpCOLORtrain
rig022-rsvptrain
updateRSVP

STASHES
SUBMODULES
SUBTREES

All Branches | Show Remote Branches | Ancestor Order | Jump to:

| Graph | Description | Commit | Author | Date |
|---|---|---|---|---|
| | live test debug, IMPORTANT changes | 23c8e38 | micheleacox <michele.a.cox@gmail.com> | Feb 29, 2016, 3:4... |
| | merge | e2acadb | micheleacox <michele.a.cox@gmail.com> | Feb 29, 2016, 3:0... |
| | changed params to match other changes | e16251b | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 3:0... |
| | added stimcond to txt file | f673cfc | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 3:0... |
| | Merge remote-tracking branch 'origin/rig022-rsvpCOLORtrain' into upda... | f89d68c | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:5... |
| | origin/rig022-rsvpCOLORtrain 1st run with color | 70bea99 | micheleacox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:2... |
| | origin/rig022-rsvptrain daily changes | 79ac2ac | micheleacox <michele.a.cox@gmail.com> | Feb 29, 2016, 11:... |
| | daily changes | 9a7d1f1 | micheleacox <michele.a.cox@gmail.com> | Feb 26, 2016, 3:0... |
| | fixed reward error | 01b6f29 | micheleacox <michele.a.cox@gmail.com> | Feb 26, 2016, 3:0... |
| | resolved merge conflict | dda196a | micheleacox <michele.a.cox@gmail.com> | Feb 26, 2016, 10:... |
| | origin/master origin/HEAD added "eventmarker(8); % EM8 = 'fixati... | 48f1323 | Michele Cox <michele.a.cox@gmail.com> | Feb 25, 2016, 3:1... |
| | Kacie added jitter for ISI for LGN | b820f86 | Rig 021 <michele.a.cox@gmail.com> | Feb 25, 2016, 2:4... |
| | moved virtual fix location to left | 7b0908f | Rig 021 <michele.a.cox@gmail.com> | Feb 15, 2016, 12:... |
| | added option for rns in each/either eye | f97ff65 | Rig 021 <michele.a.cox@gmail.com> | Feb 15, 2016, 12:... |
| | daily changes | 506ef22 | Rig 021 <michele.a.cox@gmail.com> | Jan 31, 2016, 3:5... |
| | daily changes | e2b5c72 | micheleacox <michele.a.cox@gmail.com> | Feb 26, 2016, 10:... |
| | added files for rsvp ln = 3 | 4181d61 | micheleacox <michele.a.cox@gmail.com> | Feb 26, 2016, 10:... |
| | added to dir | 8193484 | Rig 021 <michele.a.cox@gmail.com> | Jan 30, 2016, 6:3... |
| | daily changes | 7205ec4 | micheleacox <michele.a.cox@gmail.com> | Feb 29, 2016, 3:0... |
| | added interoc phase option, cleaned up. | 9b0ad2b | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:4... |
| | added option for TARGET in UNCUED stream, added interoc phase, impr... | 3d5d18c | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:4... |
| | simplified, removed bad code | 4b6f624 | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:3... |
| | added rsvploc for UNCUED stream | b6575b0 | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:3... |
| | added rgb2hex and hex2rgb | 36b5a22 | Michele Cox <michele.a.cox@gmail.com> | Feb 29, 2016, 2:3... |
| | added "eventmarker(8); % EM8 = 'fixation occurs';" | df40948 | Michele Cox <michele.a.cox@gmail.com> | Feb 25, 2016, 4:1... |
| | started to clean up / match to development of grating-based tasks , wan... | 994cf93 | Michele Cox <michele.a.cox@gmail.com> | Jan 30, 2016, 6:2... |
| | removed unused files | 369d57f | Michele Cox <michele.a.cox@gmail.com> | Jan 30, 2016, 6:2... |
| | renamed to reflect pix size | 68a2500 | Michele Cox <michele.a.cox@gmail.com> | Jan 30, 2016, 6:2... |

Sorted by path

brfs/BRFS_1_cfg.mat
brfs/genBRFSRecord.m
distimuli/genDotRecord.m
distimuli/genGratingRecord.m

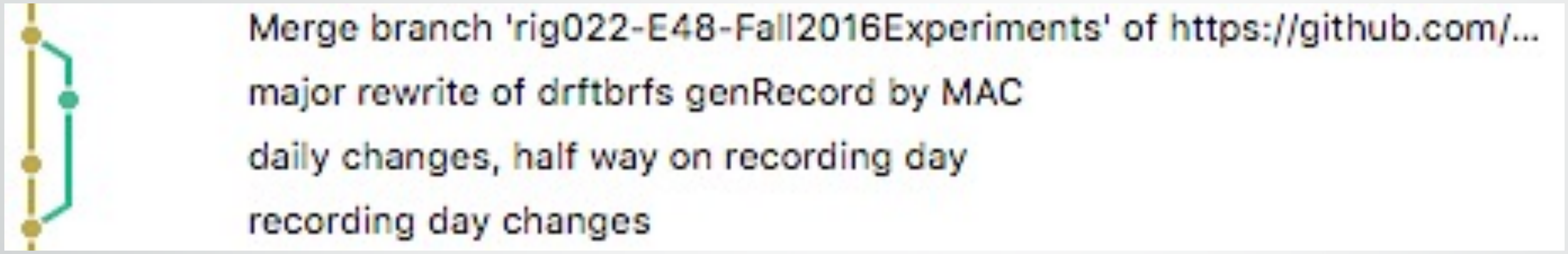
Merge remote-tracking branch 'origin/rig022-rsvpCOLORtrain' into updateRSVP

# Conflicts:
# rsvptask_stereo/gCue_di.m

brfs/BRFS_1_cfg.mat
Modified binary file | Side-by-side

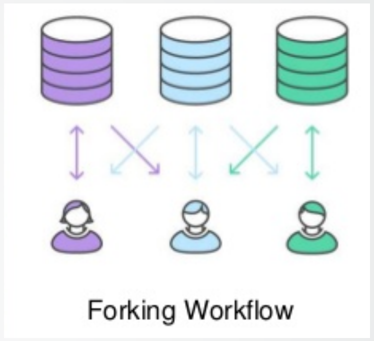
| Before | After |
|---|---|
| No Preview Available<br>3 KB (3,231 bytes) | No Preview Available<br>3 KB (3,080 bytes) |

## Case #2: Our Vision Experiments *Feature-Branch Workflow*


Merge branch 'rig022-E48-Fall2016Experiments' of https://github.com/...
major rewrite of drftbrfs genRecord by MAC
daily changes, half way on recording day
recording day changes

- **Bonus**, we also have a record of "daily changes" made during the experiments
  - Individual setups / parameter choices for each day
  - Now logged redundantly in GitHub

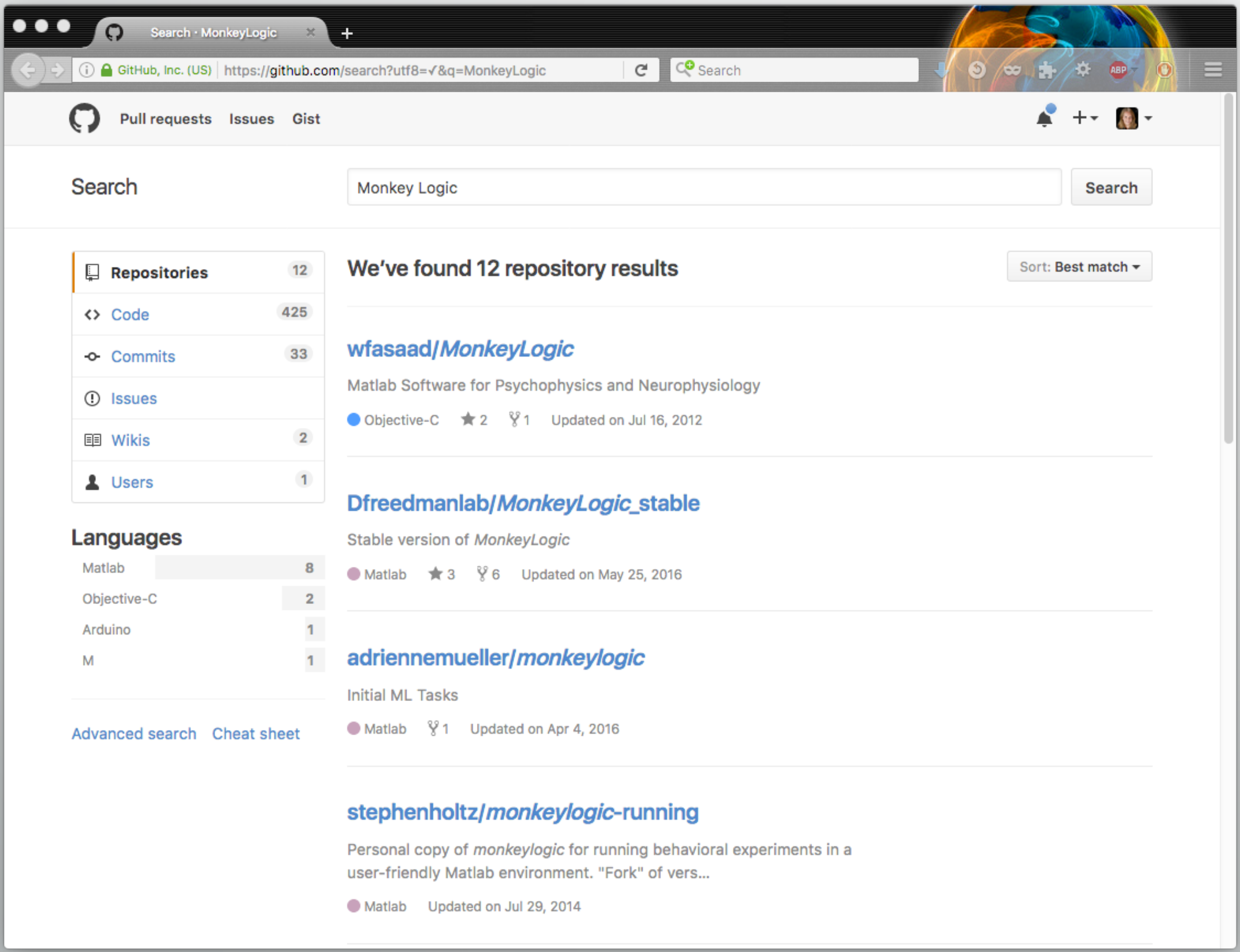
## Case #3: Using Their Software
## *Forking Workflow*



- MonkeyLogic
- Many diffent groups are developing MonkeyLogic to suite thier own needs.
- A few groups host their stable and develpment versions of MonkeyLogic on GitHub.
    - Including us!

# Case #3: Using Their Software

*Forking Workflow*


Search · MonkeyLogic
GitHub, Inc. (US) https://github.com/search?utf8=✓&q=MonkeyLogic
Pull requests Issues Gist
Search
Monkey Logic
Search

| | |
|---|---|
| Repositories | 12 |
| Code | 425 |
| Commits | 33 |
| Issues | |
| Wikis | 2 |
| Users | 1 |

**Languages**

| | |
|---|---|
| Matlab | 8 |
| Objective-C | 2 |
| Arduino | 1 |
| M | 1 |

Advanced search Cheat sheet

**We've found 12 repository results**

Sort: Best match

**wfasaad/*MonkeyLogic***
Matlab Software for Psychophysics and Neurophysiology
Objective-C ★ 2 1 Updated on Jul 16, 2012

**Dfreedmanlab/*MonkeyLogic*_stable**
Stable version of *MonkeyLogic*
Matlab ★ 3 6 Updated on May 25, 2016

**adriennemueller/*monkeylogic***
Initial ML Tasks
Matlab 1 Updated on Apr 4, 2016

**stephenholtz/*monkeylogic*-running**
Personal copy of *monkeylogic* for running behavioral experiments in a user-friendly Matlab environment. "Fork" of vers...
Matlab Updated on Jul 29, 2014

## Case #3: Using Their Software *Forking Workflow*

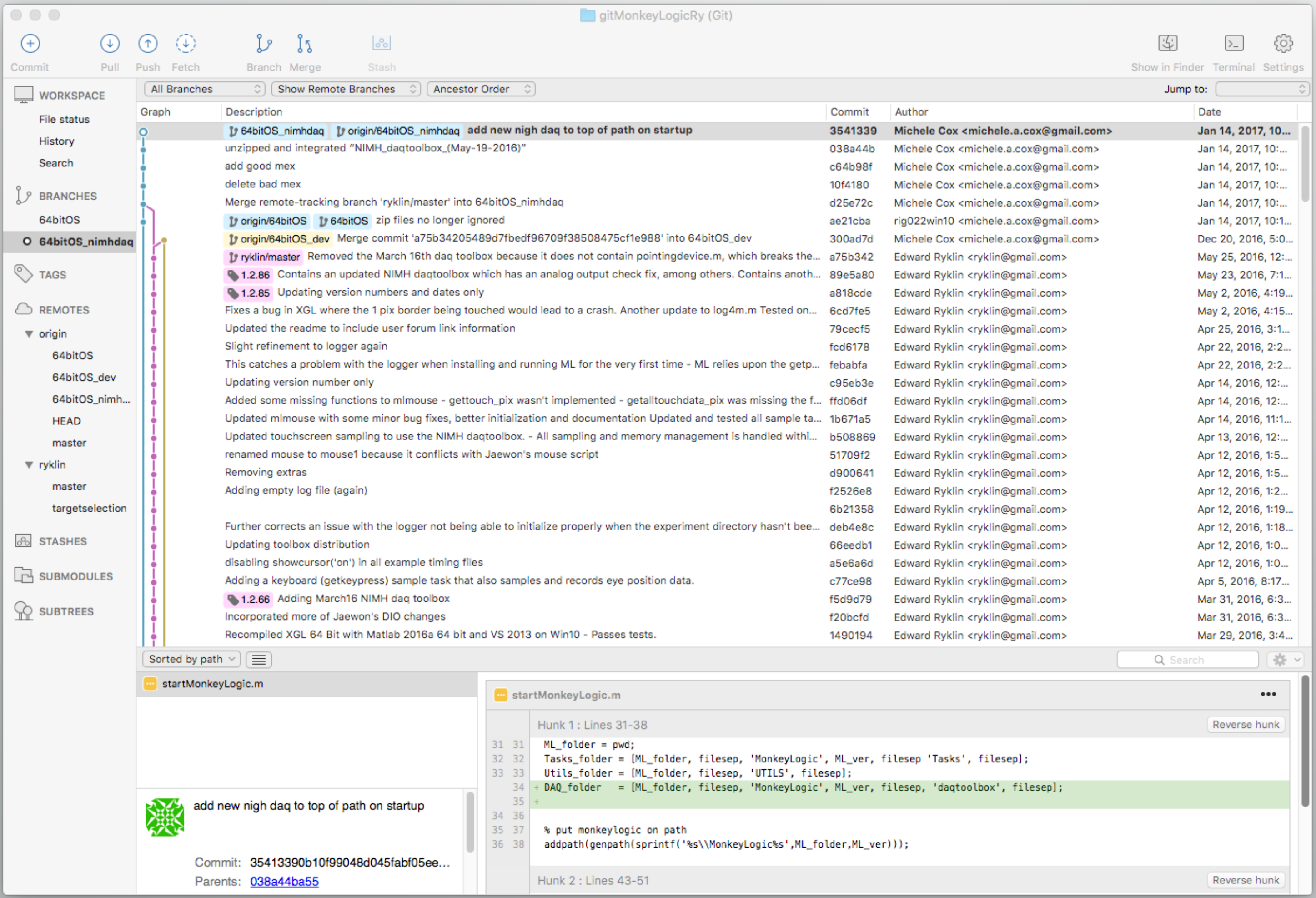
- One developer in particular who is adding lots of new features I was curious about
  - So I “forked” his GitHub repository
  - Merged it with my own version of the software, resolving any merge errors
- Continued to develop ”my version”
  - By default, making my commits avaialbie on GitHub for others (not an offical “release”)

## Case #3: Using Their Software *Forking Workflow*

- Two things happened:
    1. The other developer continued to develop their version, and as new features were released I was able to "pull" those changes into my working version
        - I got a better version of the software ***without undoing lab-specific customizations***
        - I didn't have to do the work myself!

# Case #3: Using Their Software

## *Forking Workflow*



| Graph | Description | Commit | Author | Date |
|---|---|---|---|---|
| | 64bitOS_nimhdaq origin/64bitOS_nimhdaq **add new nigh daq to top of path on startup** | **3541339** | **Michele Cox <michele.a.cox@gmail.com>** | **Jan 14, 2017, 10...** |
| | unzipped and integrated "NIMH_daqtoolbox_(May-19-2016)" | 038a44b | Michele Cox <michele.a.cox@gmail.com> | Jan 14, 2017, 10:... |
| | add good mex | c64b98f | Michele Cox <michele.a.cox@gmail.com> | Jan 14, 2017, 10:... |
| | delete bad mex | 10f4180 | Michele Cox <michele.a.cox@gmail.com> | Jan 14, 2017, 10:... |
| | Merge remote-tracking branch 'ryklin/master' into 64bitOS_nimhdaq | d25e72c | Michele Cox <michele.a.cox@gmail.com> | Jan 14, 2017, 10:... |
| | origin/64bitOS 64bitOS zip files no longer ignored | ae21cba | rig022win10 <michele.a.cox@gmail.com> | Jan 14, 2017, 10:1... |
| | origin/64bitOS_dev Merge commit 'a75b34205489d7fbedf96709f38508475cf1e988' into 64bitOS_dev | 300ad7d | Michele Cox <michele.a.cox@gmail.com> | Dec 20, 2016, 5:0... |
| | ryklin/master Removed the March 16th daq toolbox because it does not contain pointingdevice.m, which breaks the... | a75b342 | Edward Ryklin <ryklin@gmail.com> | May 25, 2016, 12:... |
| | 1.2.86 Contains an updated NIMH daqtoolbox which has an analog output check fix, among others. Contains anoth... | 89e5a80 | Edward Ryklin <ryklin@gmail.com> | May 23, 2016, 7:1... |
| | 1.2.85 Updating version numbers and dates only | a818cde | Edward Ryklin <ryklin@gmail.com> | May 2, 2016, 4:19... |
| | Fixes a bug in XGL where the 1 pix border being touched would lead to a crash. Another update to log4m.m Tested on... | 6cd7fe5 | Edward Ryklin <ryklin@gmail.com> | May 2, 2016, 4:15... |
| | Updated the readme to include user forum link information | 79cecf5 | Edward Ryklin <ryklin@gmail.com> | Apr 25, 2016, 3:1... |
| | Slight refinement to logger again | fcd6178 | Edward Ryklin <ryklin@gmail.com> | Apr 22, 2016, 2:2... |
| | This catches a problem with the logger when installing and running ML for the very first time - ML relies upon the getp... | febabfa | Edward Ryklin <ryklin@gmail.com> | Apr 22, 2016, 2:2... |
| | Updating version number only | c95eb3e | Edward Ryklin <ryklin@gmail.com> | Apr 14, 2016, 12:... |
| | Added some missing functions to mlmouse - gettouch_pix wasn't implemented - getalltouchdata_pix was missing the f... | ffd06df | Edward Ryklin <ryklin@gmail.com> | Apr 14, 2016, 12:... |
| | Updated mlmouse with some minor bug fixes, better initialization and documentation Updated and tested all sample ta... | 1b671a5 | Edward Ryklin <ryklin@gmail.com> | Apr 14, 2016, 11:1... |
| | Updated touchscreen sampling to use the NIMH daqtoolbox. - All sampling and memory management is handled withi... | b508869 | Edward Ryklin <ryklin@gmail.com> | Apr 13, 2016, 12:... |
| | renamed mouse to mouse1 because it conflicts with Jaewon's mouse script | 51709f2 | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:5... |
| | Removing extras | d900641 | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:5... |
| | Adding empty log file (again) | f2526e8 | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:2... |
| | | 6b21358 | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:19... |
| | Further corrects an issue with the logger not being able to initialize properly when the experiment directory hasn't bee... | deb4e8c | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:18... |
| | Updating toolbox distribution | 66eedb1 | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:0... |
| | disabling showcursor('on') in all example timing files | a5e6a6d | Edward Ryklin <ryklin@gmail.com> | Apr 12, 2016, 1:0... |
| | Adding a keyboard (getkeypress) sample task that also samples and records eye position data. | c77ce98 | Edward Ryklin <ryklin@gmail.com> | Apr 5, 2016, 8:17... |
| | 1.2.66 Adding March16 NIMH daq toolbox | f5d9d79 | Edward Ryklin <ryklin@gmail.com> | Mar 31, 2016, 6:3... |
| | Incorporated more of Jaewon's DIO changes | f20bcfd | Edward Ryklin <ryklin@gmail.com> | Mar 31, 2016, 6:3... |
| | Recompiled XGL 64 Bit with Matlab 2016a 64 bit and VS 2013 on Win10 - Passes tests. | 1490194 | Edward Ryklin <ryklin@gmail.com> | Mar 29, 2016, 3:4... |

startMonkeyLogic.m

add new nigh daq to top of path on startup

Commit: 35413390b10f99048d045fabf05ee...
Parents: 038a44ba55

startMonkeyLogic.m

Hunk 1 : Lines 31-38

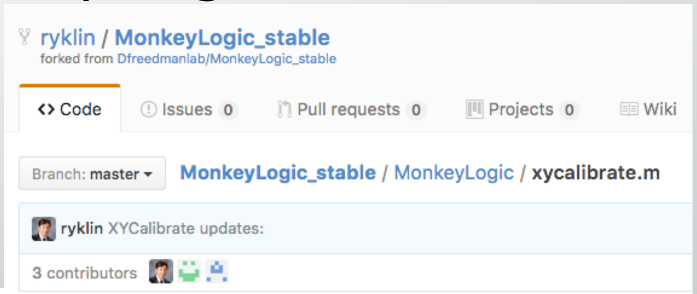
```
  ML_folder = pwd;
  Tasks_folder = [ML_folder, filesep, 'MonkeyLogic', ML_ver, filesep 'Tasks', filesep];
  Utils_folder = [ML_folder, filesep, 'UTILS', filesep];
+ DAQ_folder   = [ML_folder, filesep, 'MonkeyLogic', ML_ver, filesep, 'daqtoolbox', filesep];
+

  % put monkeylogic on path
  addpath(genpath(sprintf('%s\\MonkeyLogic%s',ML_folder,ML_ver)));
```

Hunk 2 : Lines 43-51

# Case #3: Using Their Software *Forking Workflow*

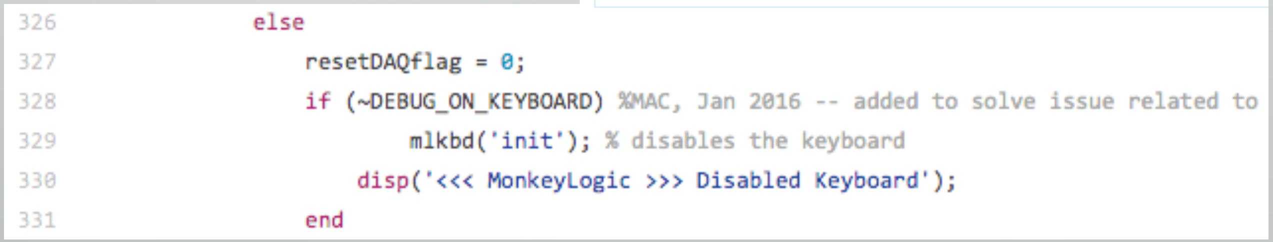
- Two things happened:
  1. The other developer continued to develop their version, and as new features were released I was able to "pull" those changes into my working version
  2. The other developer pulled my bug fixes and features to their version.


ryklin / MonkeyLogic_stable
forked from Dfreedmanlab/MonkeyLogic_stable
Code
Issues 0
Pull requests 0
Projects 0
Wiki
Branch: master

MonkeyLogic_stable / MonkeyLogic / xycalibrate.m

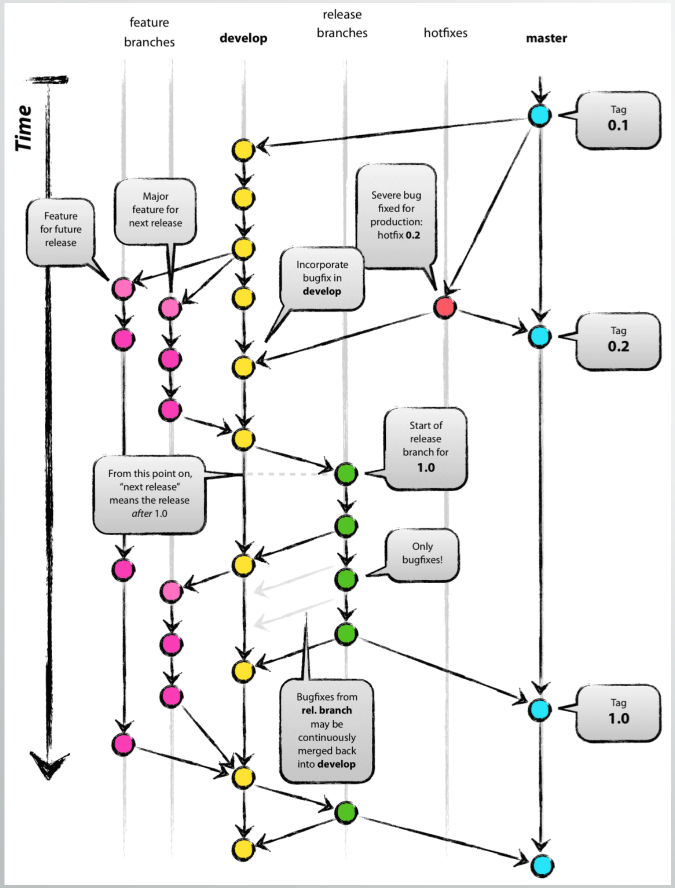
ryklin XYCalibrate updates:

3 contributors



```
            else
                resetDAQflag = 0;
                if (~DEBUG_ON_KEYBOARD) %MAC, Jan 2016 -- added to solve issue related to
                        mlkbd('init'); % disables the keyboard
                    disp('<<< MonkeyLogic >>> Disabled Keyboard');
                end
```

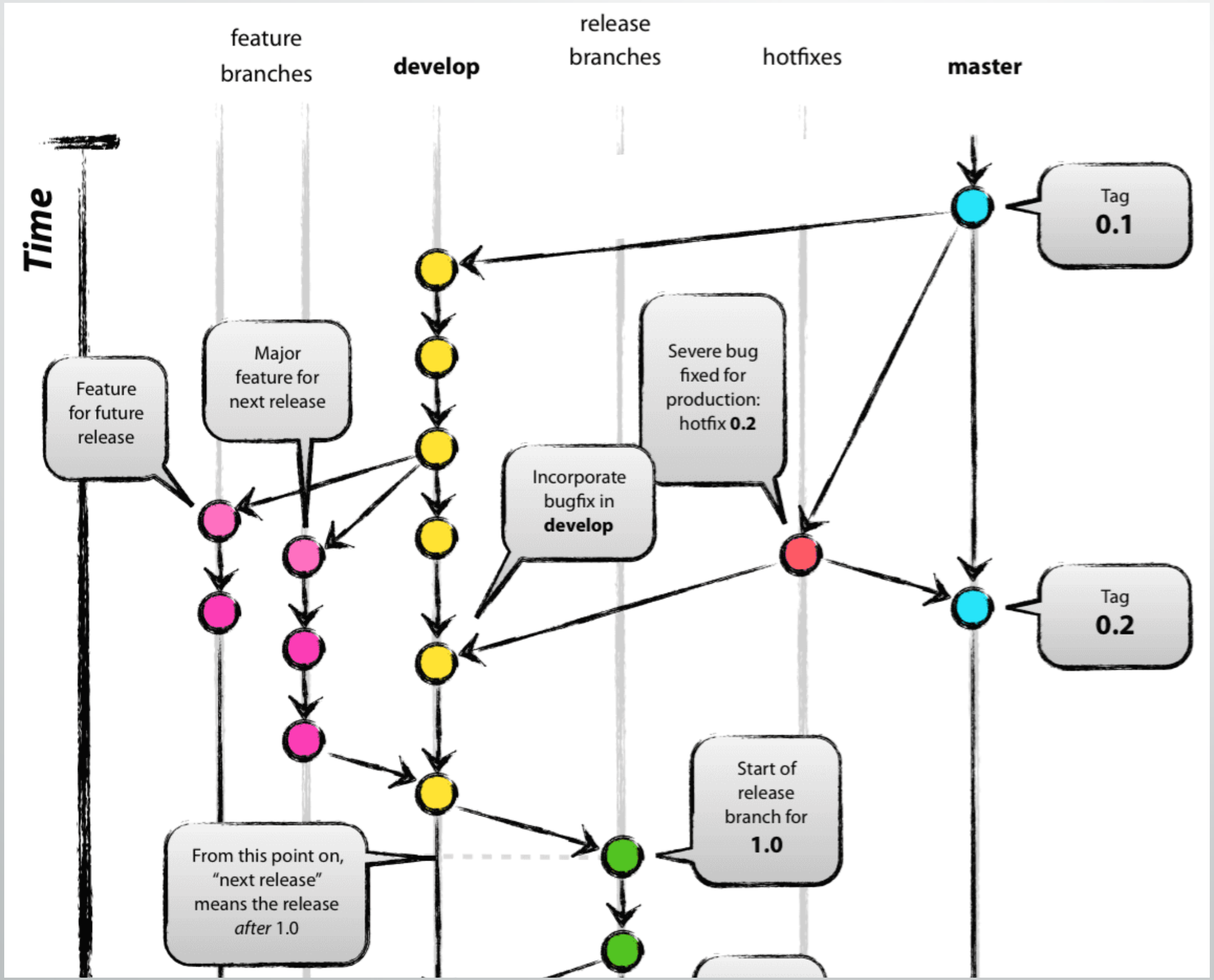
# “Gitflow” as a Model


feature branches
develop
release branches
hotfixes
master
Time
Tag 0.1
Severe bug fixed for production: hotfix 0.2
Major feature for next release
Feature for future release
Incorporate bugfix in develop
Tag 0.2
Start of release branch for 1.0
From this point on, “next release” means the release after 1.0
Only bugfixes!
Bugfixes from rel. branch may be continuously merged back into develop
Tag 1.0

- In 2010, Vincent Driessen blogged about a git development model.
  - He’d been using it for about a year.
  - First public discription
- Named “GitFlow”, Driessen`s model workflow  took off in the git community.
  - Spawned the creating of a set of git extensions to more easily implement and manage the workflow.

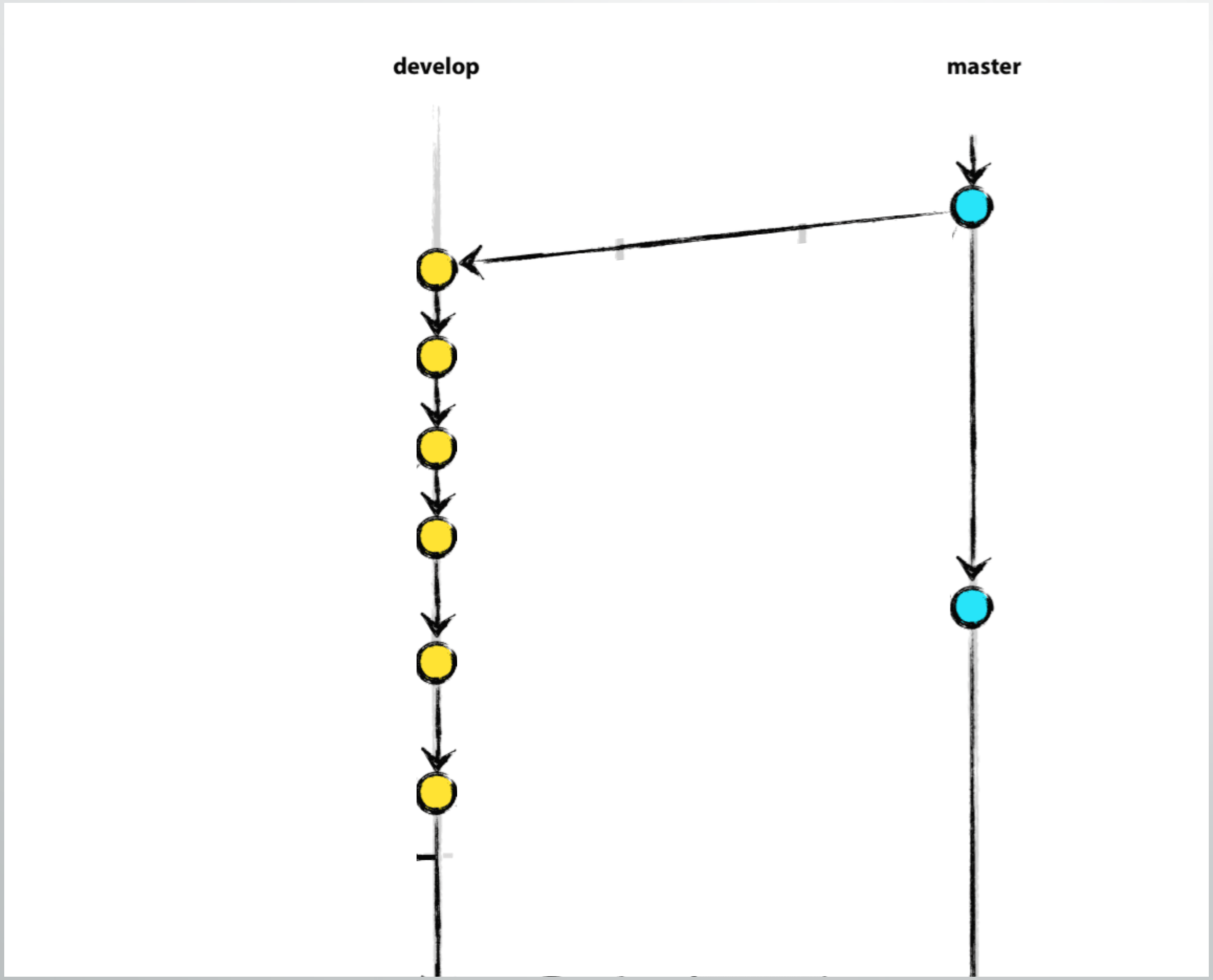
http://nvie.com/posts/a-successful-git-branching-model/

# “Gitflow” as a Model


feature branches
develop
release branches
hotfixes
master
Time
Tag 0.1
Major feature for next release
Feature for future release
Severe bug fixed for production: hotfix 0.2
Incorporate bugfix in develop
Tag 0.2
Start of release branch for 1.0
From this point on, “next release” means the release *after* 1.0

http://nvie.com/posts/a-successful-git-branching-model/

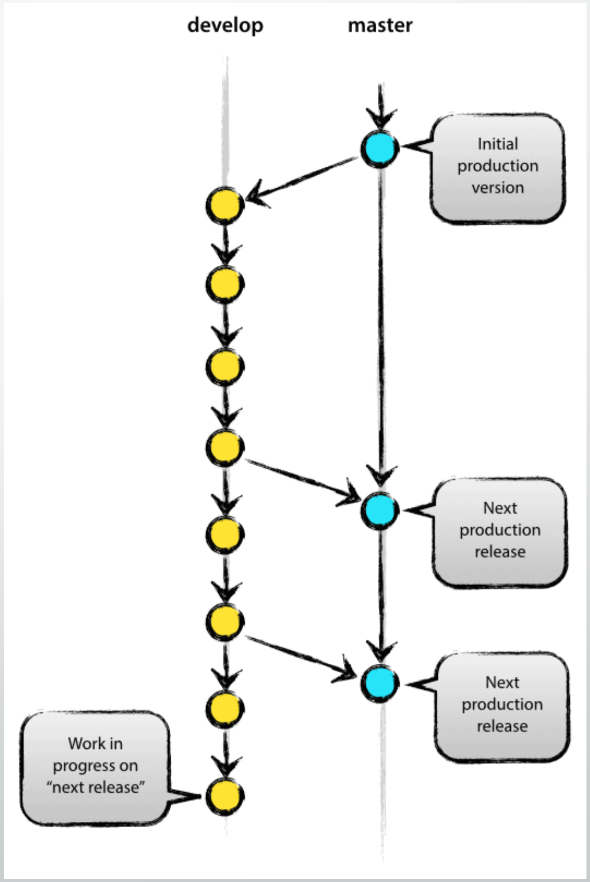
## “Gitflow” as a Model



http://nvie.com/posts/a-successful-git-branching-model/

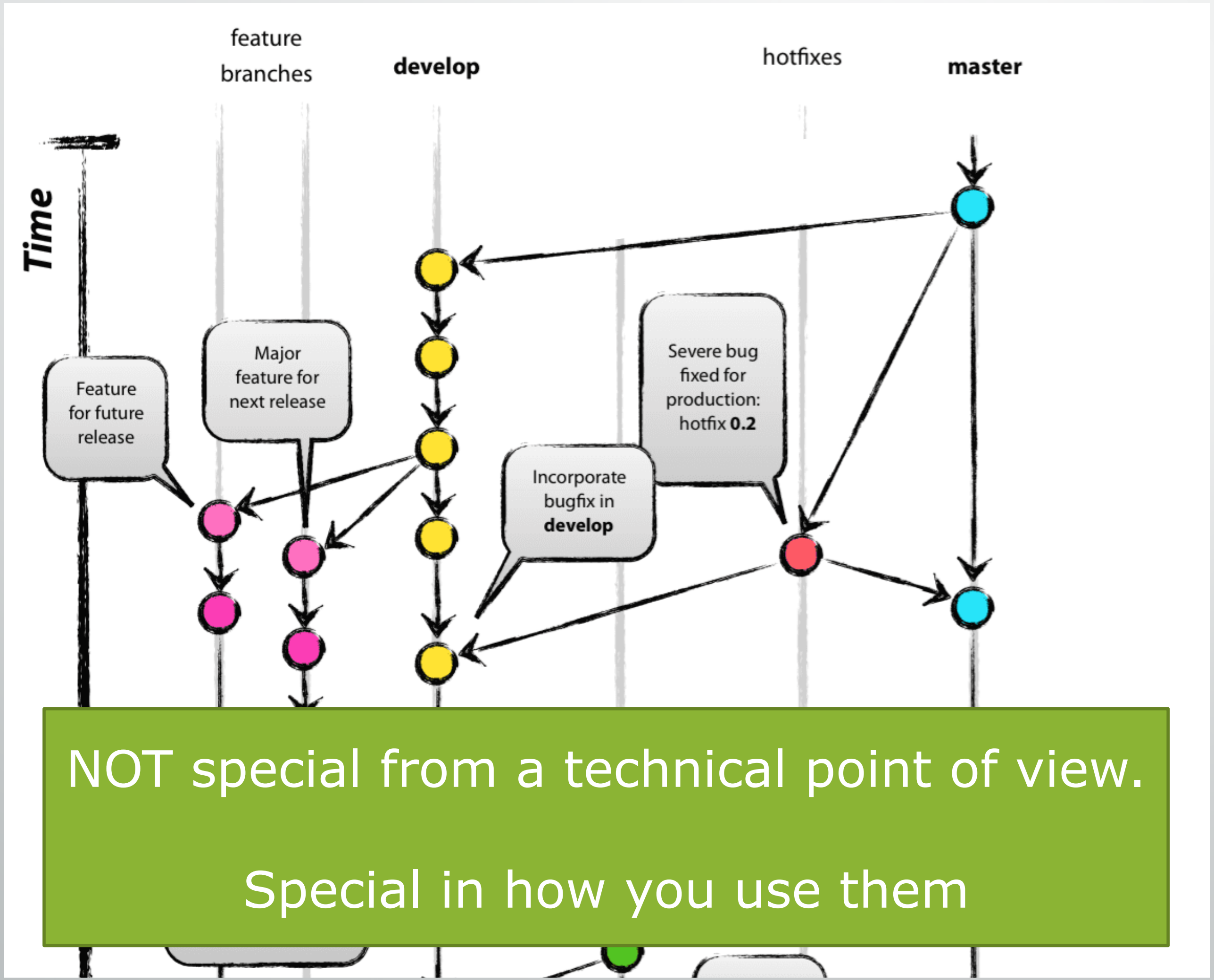
# “Gitflow” as a Model

- **master** - branch where code always reflects a *production-ready* state.
- **develop** - branch where the code reflects a state with the latest <u>development changes</u>
- WHEN the <u>develop branch reaches a stable point</u>, all changes should be merged back into master


develop
master
Initial production version
Next production release
Next production release
Work in progress on "next release"

http://nvie.com/posts/a-successful-git-branching-model/

# “Gitflow” as a Model

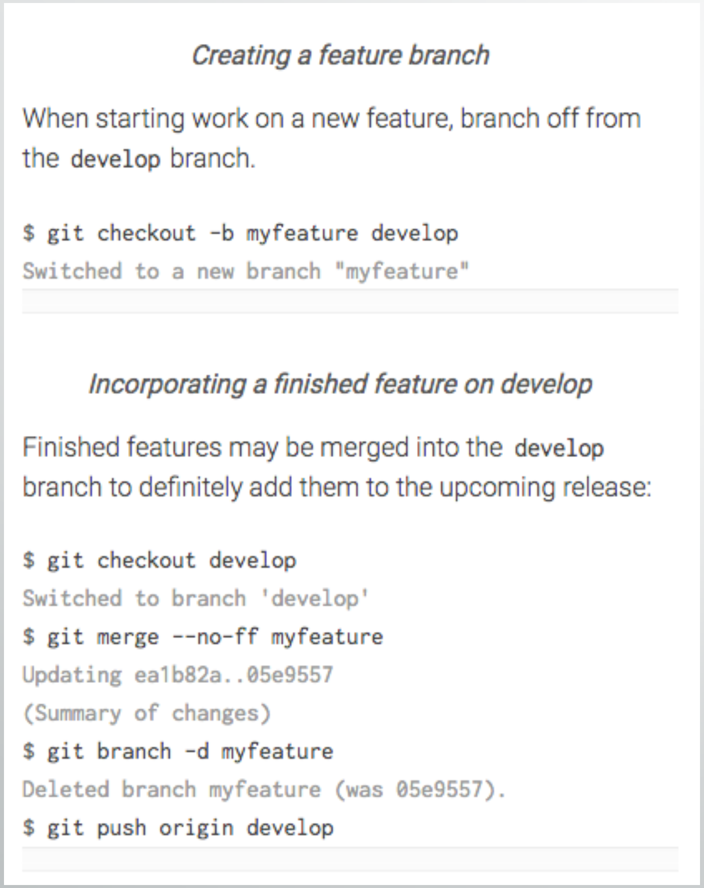

feature branches
develop
hotfixes
master
Time
Feature for future release
Major feature for next release
Incorporate bugfix in **develop**
Severe bug fixed for production: hotfix **0.2**

NOT special from a technical point of view.

Special in how you use them

http://nvie.com/posts/a-successful-git-branching-model/

# “Gitflow” as a Model



*Creating a feature branch*

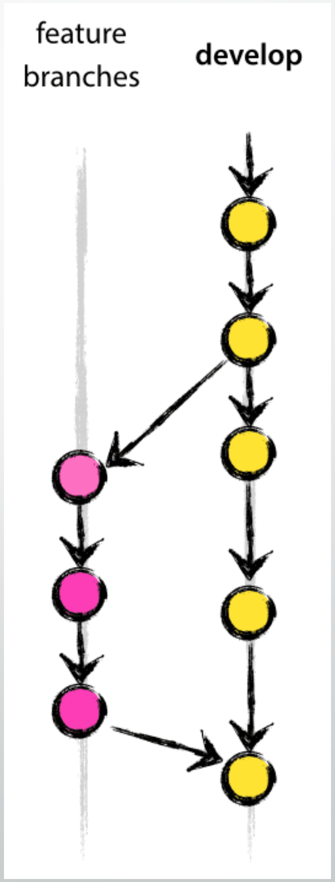
When starting work on a new feature, branch off from the `develop` branch.

```
$ git checkout -b myfeature develop
Switched to a new branch "myfeature"
```

*Incorporating a finished feature on develop*

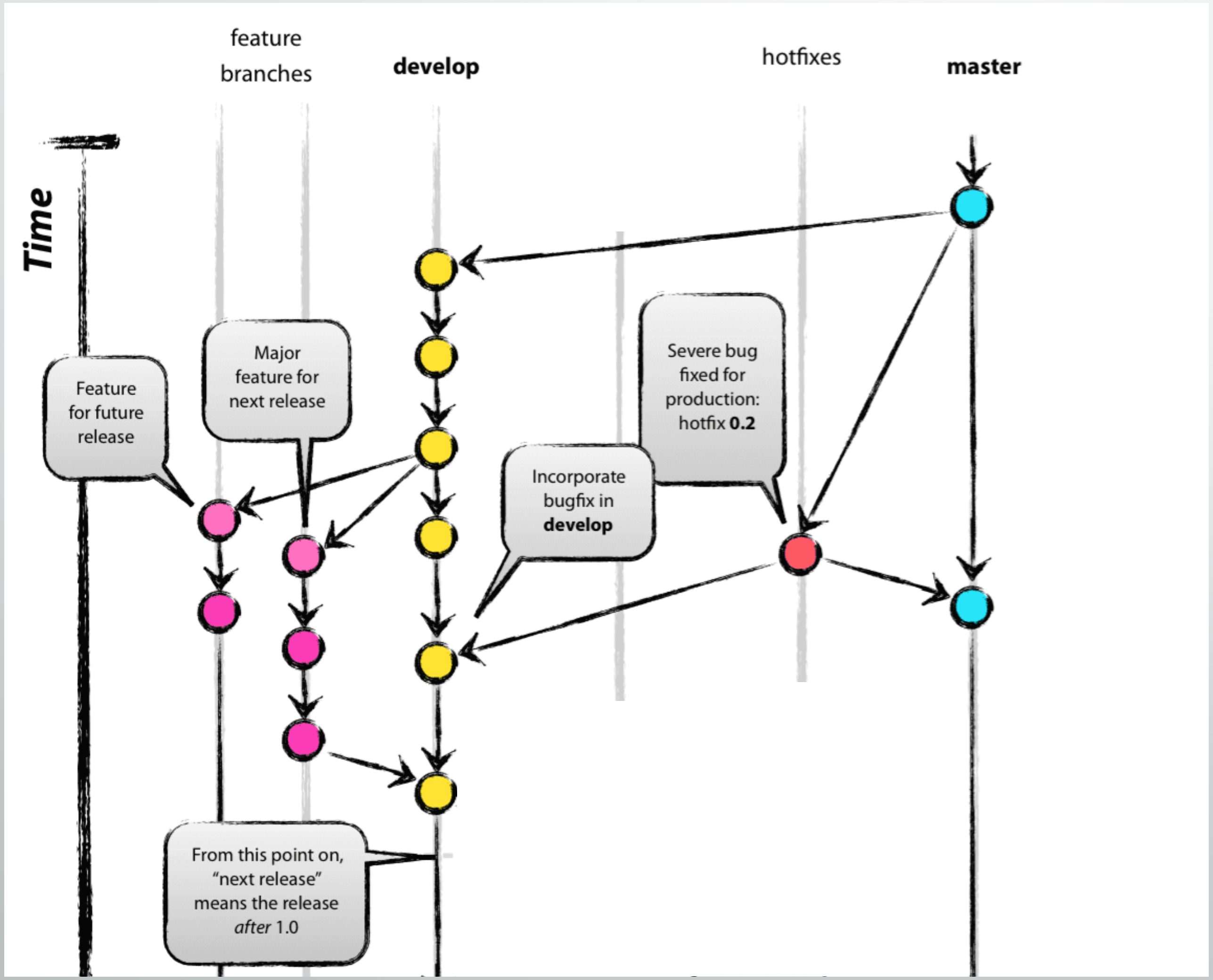
Finished features may be merged into the `develop` branch to definitely add them to the upcoming release:

```
$ git checkout develop
Switched to branch 'develop'
$ git merge --no-ff myfeature
Updating ea1b82a..05e9557
(Summary of changes)
$ git branch -d myfeature
Deleted branch myfeature (was 05e9557).
$ git push origin develop
```



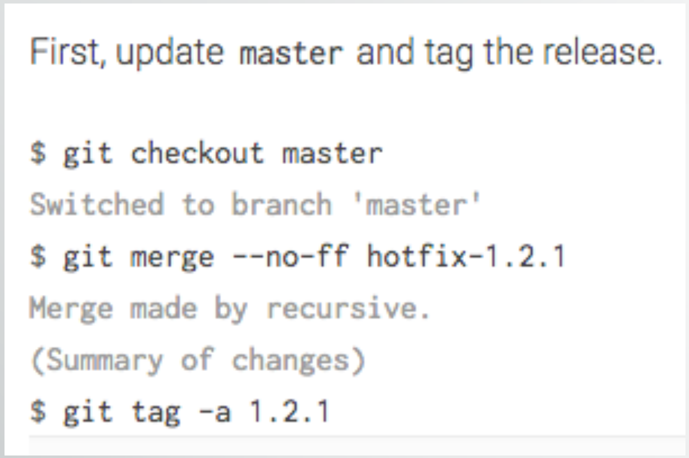
http://nvie.com/posts/a-successful-git-branching-model/

# “Gitflow” as a Model


feature branches
develop
hotfixes
master
Time
Major feature for next release
Feature for future release
Severe bug fixed for production: hotfix **0.2**
Incorporate bugfix in **develop**
From this point on, “next release” means the release *after* 1.0

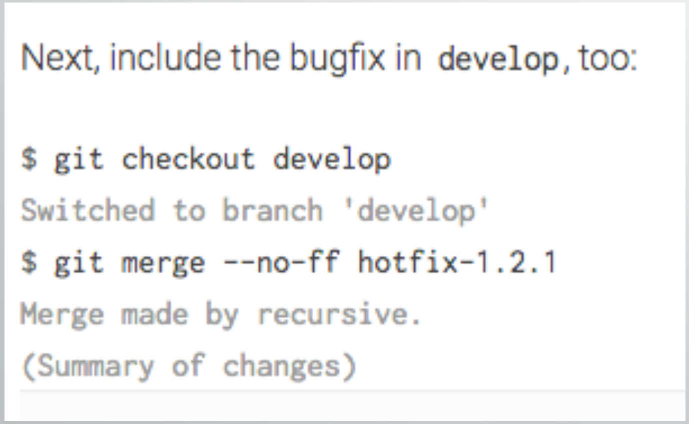
http://nvie.com/posts/a-successful-git-branching-model/

# “Gitflow” as a Model



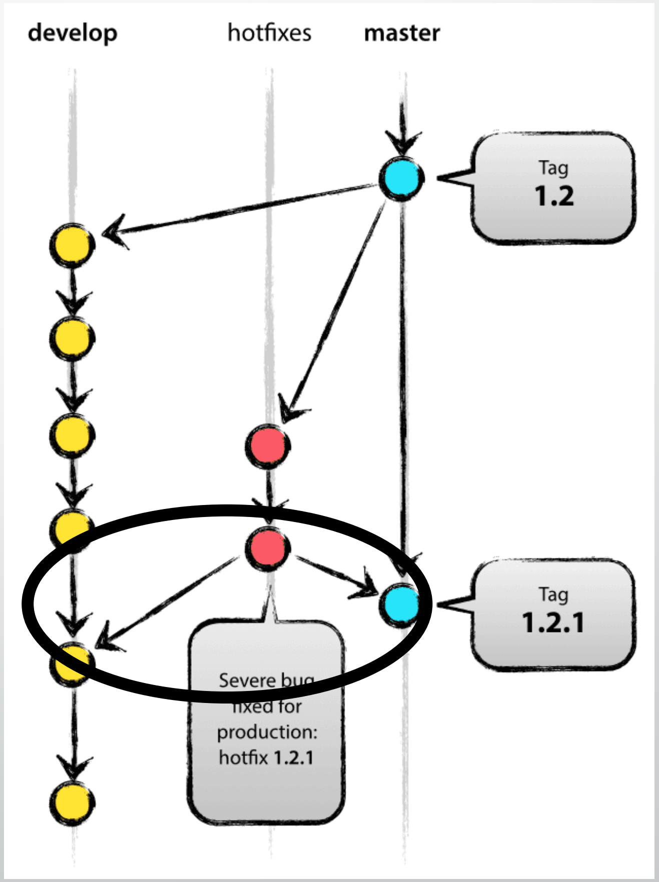
First, update master and tag the release.

```
$ git checkout master
Switched to branch 'master'
$ git merge --no-ff hotfix-1.2.1
Merge made by recursive.
(Summary of changes)
$ git tag -a 1.2.1
```



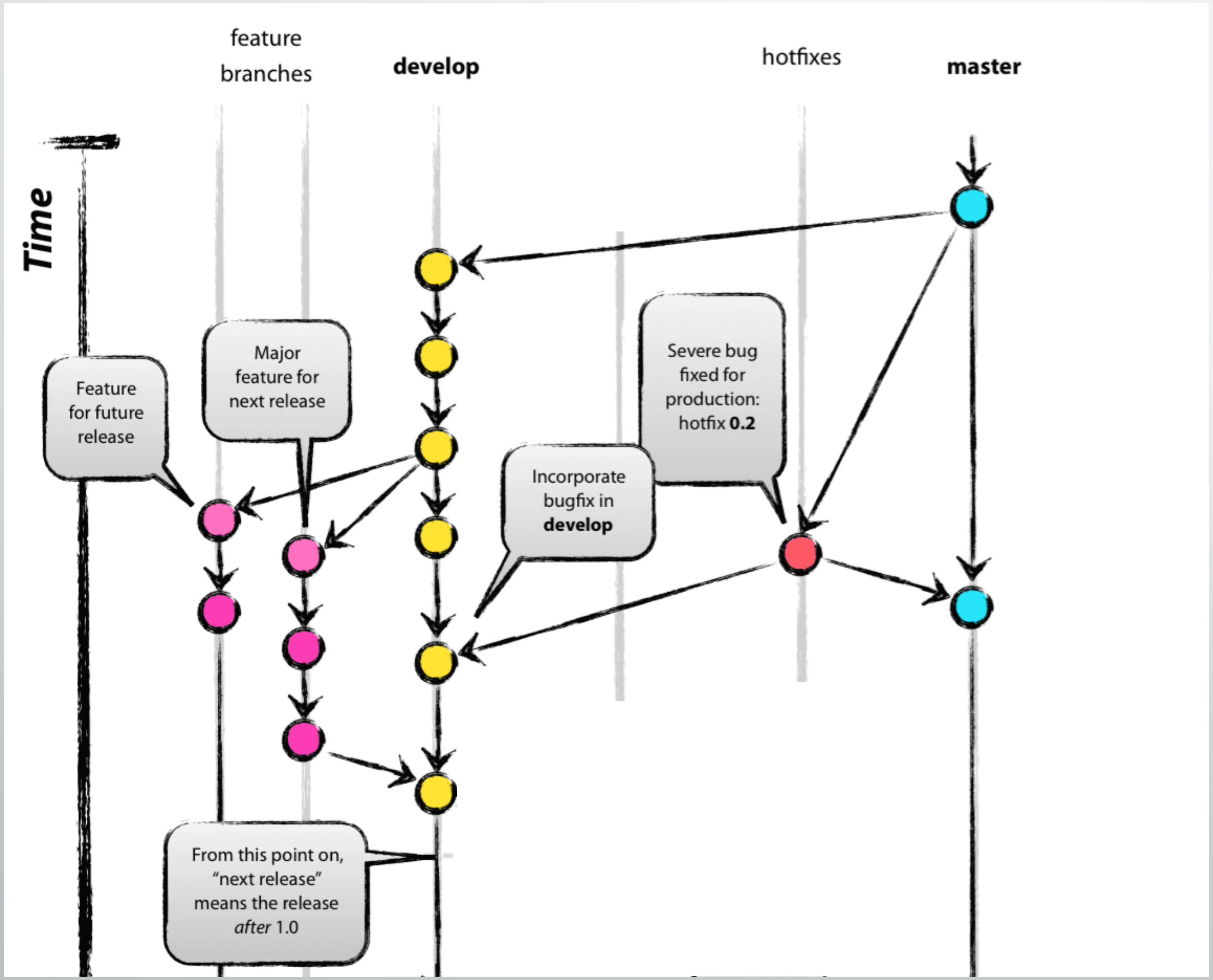
Next, include the bugfix in develop, too:

```
$ git checkout develop
Switched to branch 'develop'
$ git merge --no-ff hotfix-1.2.1
Merge made by recursive.
(Summary of changes)
```



http://nvie.com/posts/a-successful-git-branching-model/

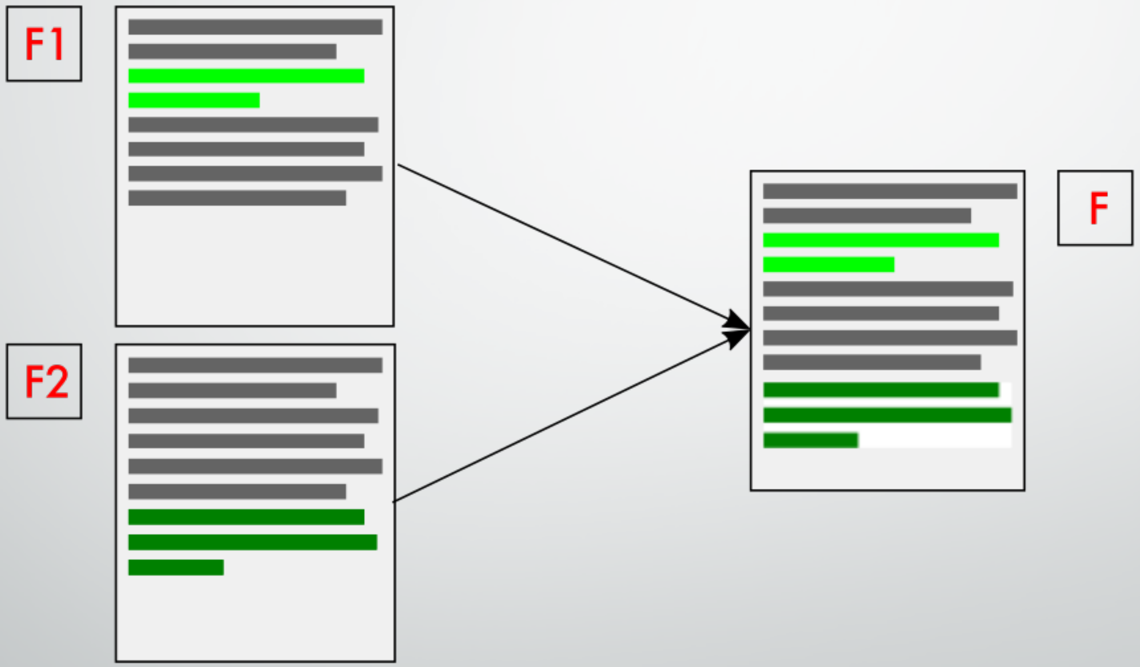
## “Gitflow” as a Model


feature branches
develop
hotfixes
master
Time
Feature for future release
Major feature for next release
Severe bug fixed for production: hotfix **0.2**
Incorporate bugfix in **develop**
From this point on, “next release” means the release *after* 1.0

http://nvie.com/posts/a-successful-git-branching-model/

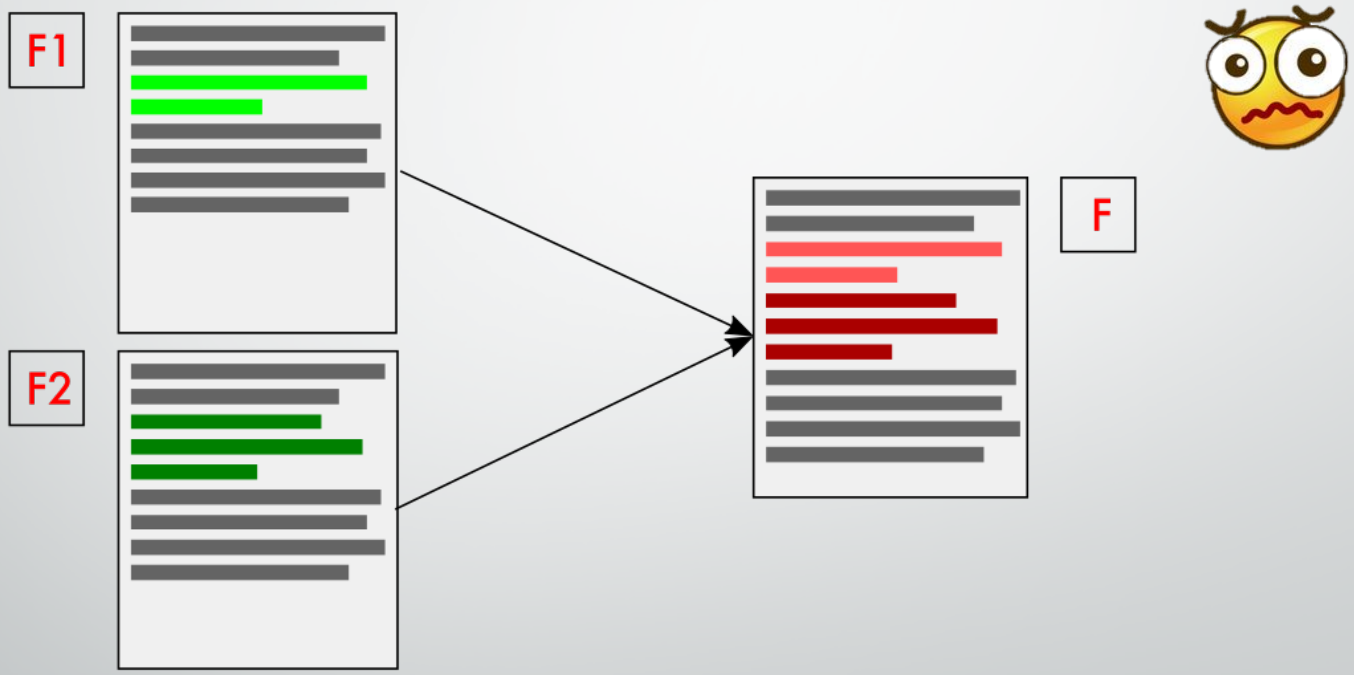
# Git Merge

***clean merge***



# Git Merge

***merge conflict!***

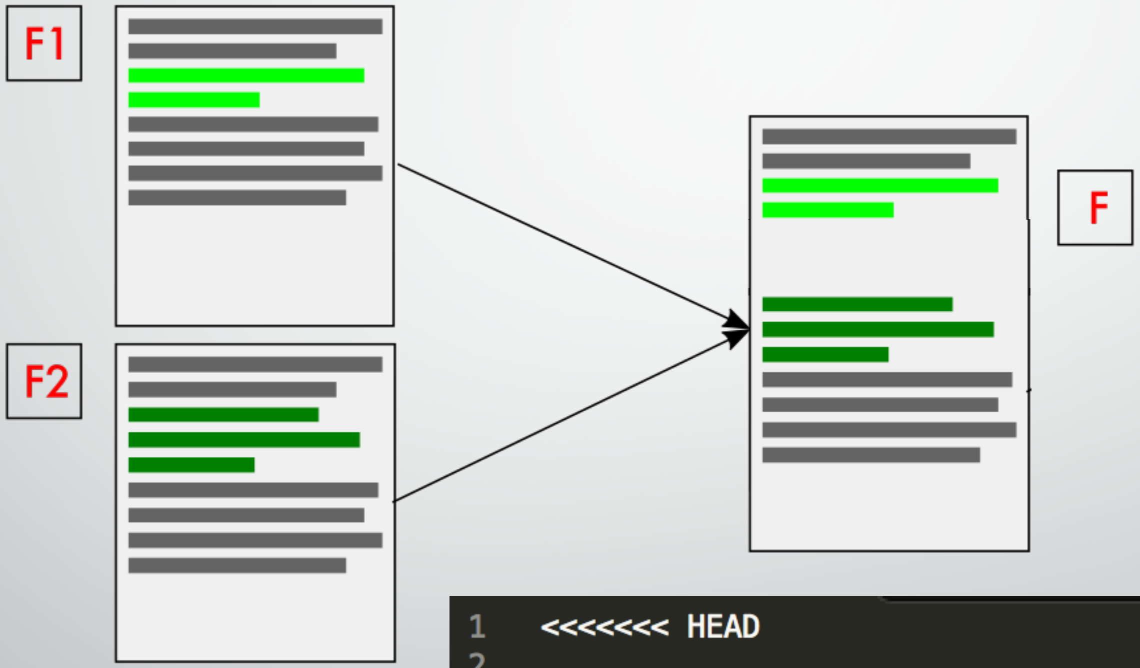


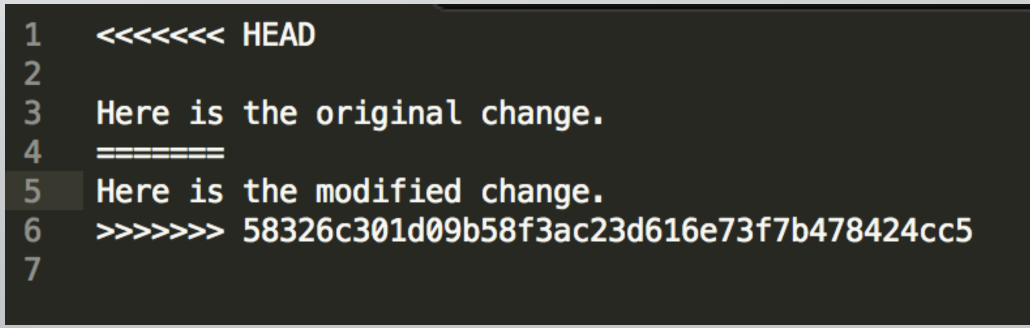
## Git Merge

- Remember, **Git tracks all changes** on a line-by-line bases
  - You can always reverse or revert a change
- Git contains a **variety of merge tools and safety checks**

# Git Merge

1. Get an error message
2. Get a merge conflict file





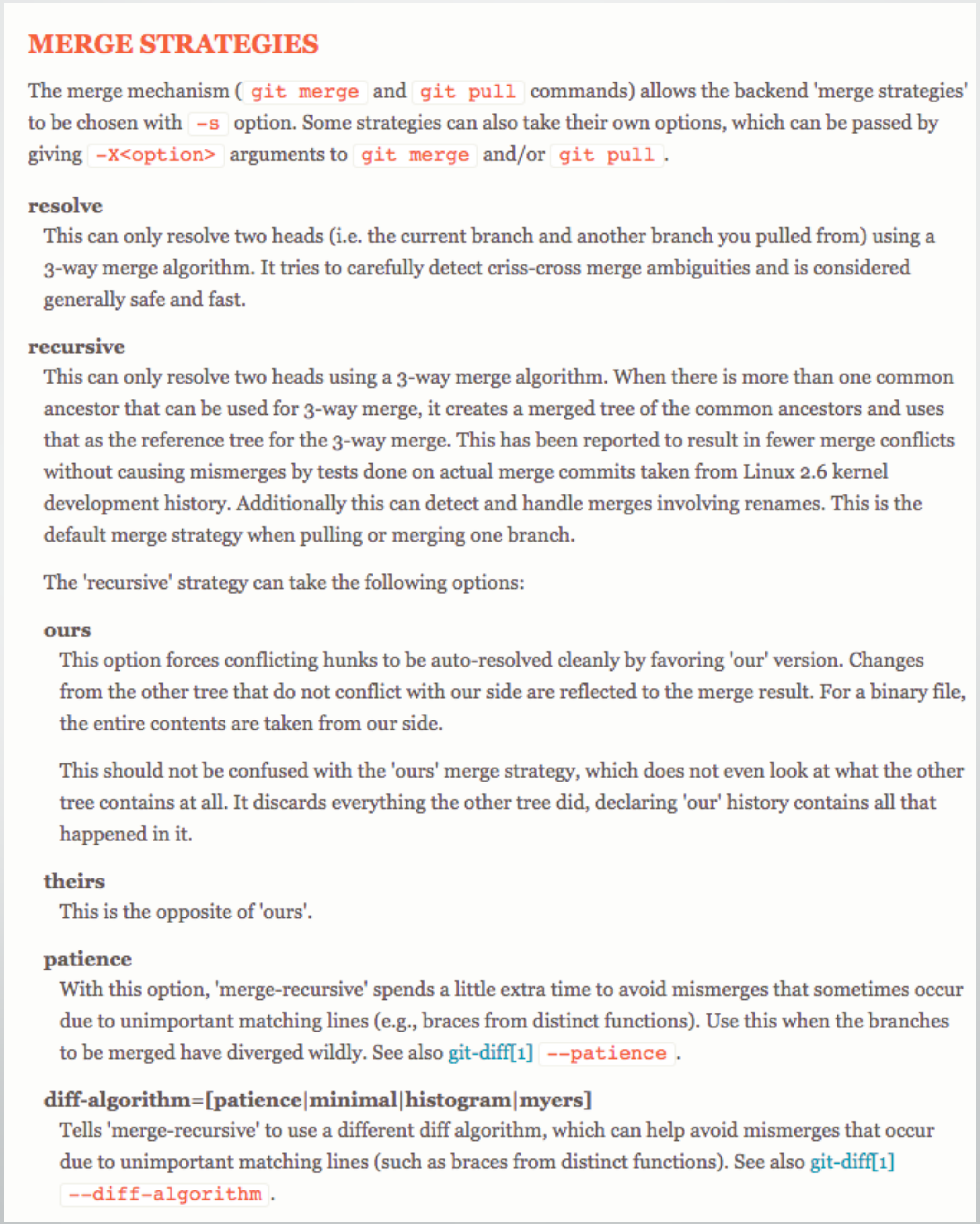
```
<<<<<<< HEAD

Here is the original change.
=======
Here is the modified change.
>>>>>>> 58326c301d09b58f3ac23d616e73f7b478424cc5

```

## Git Merge Strategies

You can also change the way that git does merges – i.e. it's merge strategy – to avoid merge conflicts



**MERGE STRATEGIES**

The merge mechanism ( `git merge` and `git pull` commands) allows the backend 'merge strategies' to be chosen with `-s` option. Some strategies can also take their own options, which can be passed by giving `-X<option>` arguments to `git merge` and/or `git pull` .

**resolve**
This can only resolve two heads (i.e. the current branch and another branch you pulled from) using a 3-way merge algorithm. It tries to carefully detect criss-cross merge ambiguities and is considered generally safe and fast.

**recursive**
This can only resolve two heads using a 3-way merge algorithm. When there is more than one common ancestor that can be used for 3-way merge, it creates a merged tree of the common ancestors and uses that as the reference tree for the 3-way merge. This has been reported to result in fewer merge conflicts without causing mismerges by tests done on actual merge commits taken from Linux 2.6 kernel development history. Additionally this can detect and handle merges involving renames. This is the default merge strategy when pulling or merging one branch.

The 'recursive' strategy can take the following options:

**ours**
This option forces conflicting hunks to be auto-resolved cleanly by favoring 'our' version. Changes from the other tree that do not conflict with our side are reflected to the merge result. For a binary file, the entire contents are taken from our side.

This should not be confused with the 'ours' merge strategy, which does not even look at what the other tree contains at all. It discards everything the other tree did, declaring 'our' history contains all that happened in it.

**theirs**
This is the opposite of 'ours'.

**patience**
With this option, 'merge-recursive' spends a little extra time to avoid mismerges that sometimes occur due to unimportant matching lines (e.g., braces from distinct functions). Use this when the branches to be merged have diverged wildly. See also git-diff[1] `--patience` .

**diff-algorithm=[patience|minimal|histogram|myers]**
Tells 'merge-recursive' to use a different diff algorithm, which can help avoid mismerges that occur due to unimportant matching lines (such as braces from distinct functions). See also git-diff[1] `--diff-algorithm` .

https://git-scm.com/docs/merge-strategies#merge-strategies-resolve

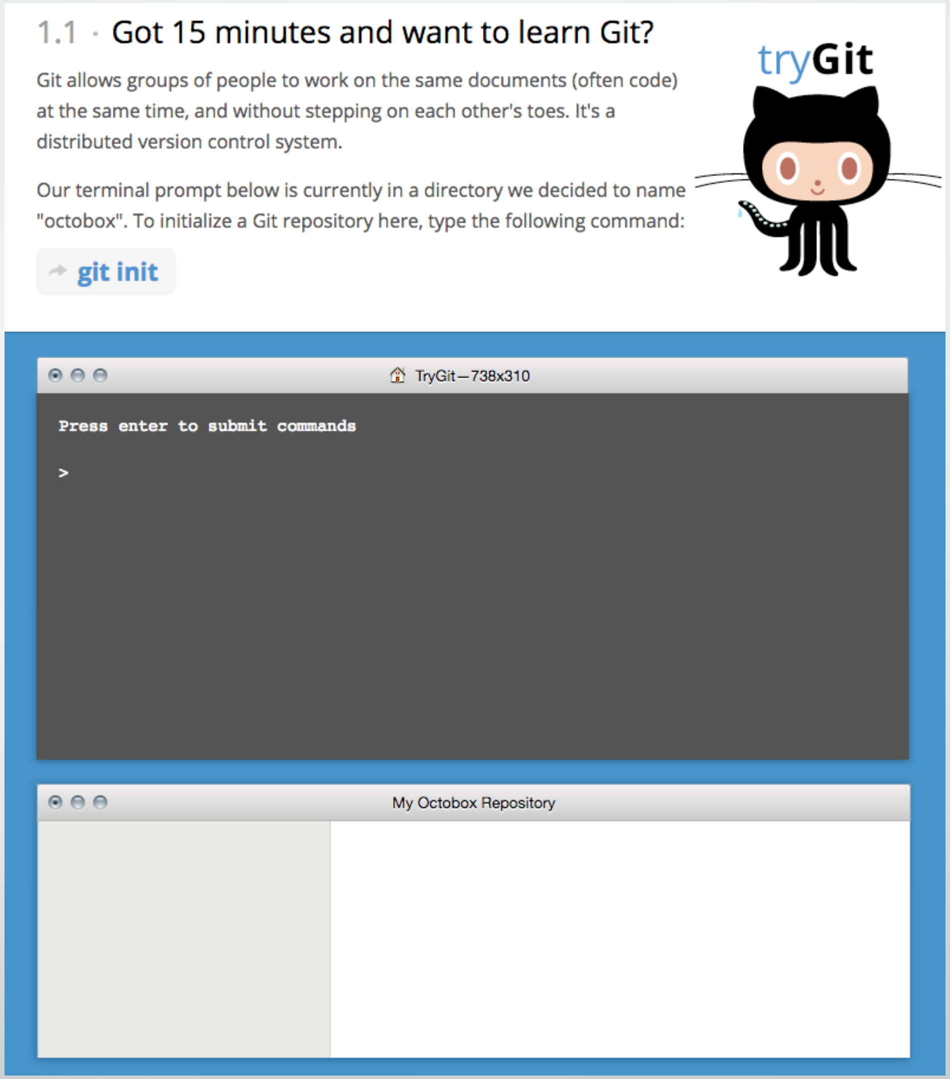
## Assembled Resources

## Getting Started

- Download and Install Git: https://git-scm.com/
  - Setup your first repository (git init)
  - Add and commit your first file
- Sign up for GitHub: https://github.com/
  - Setup a GitHub repository as the remote for your local repo
  - Push to the remote
- Optional
  - Request a free educational upgrade for GitHub as explained here: http://www.inferencelab.com/free-github-private-repos-for-academics/
  - Download SourceTree: https://www.sourcetreeapp.com/
  - Download DiffMerge: https://sourcegear.com/diffmerge/

## “Try Git" simulator

*Resources for learning Git and GitHub*



1.1 · Got 15 minutes and want to learn Git?

Git allows groups of people to work on the same documents (often code) at the same time, and without stepping on each other's toes. It's a distributed version control system.

Our terminal prompt below is currently in a directory we decided to name "octobox". To initialize a Git repository here, type the following command:

```
git init
```

TryGit—738x310

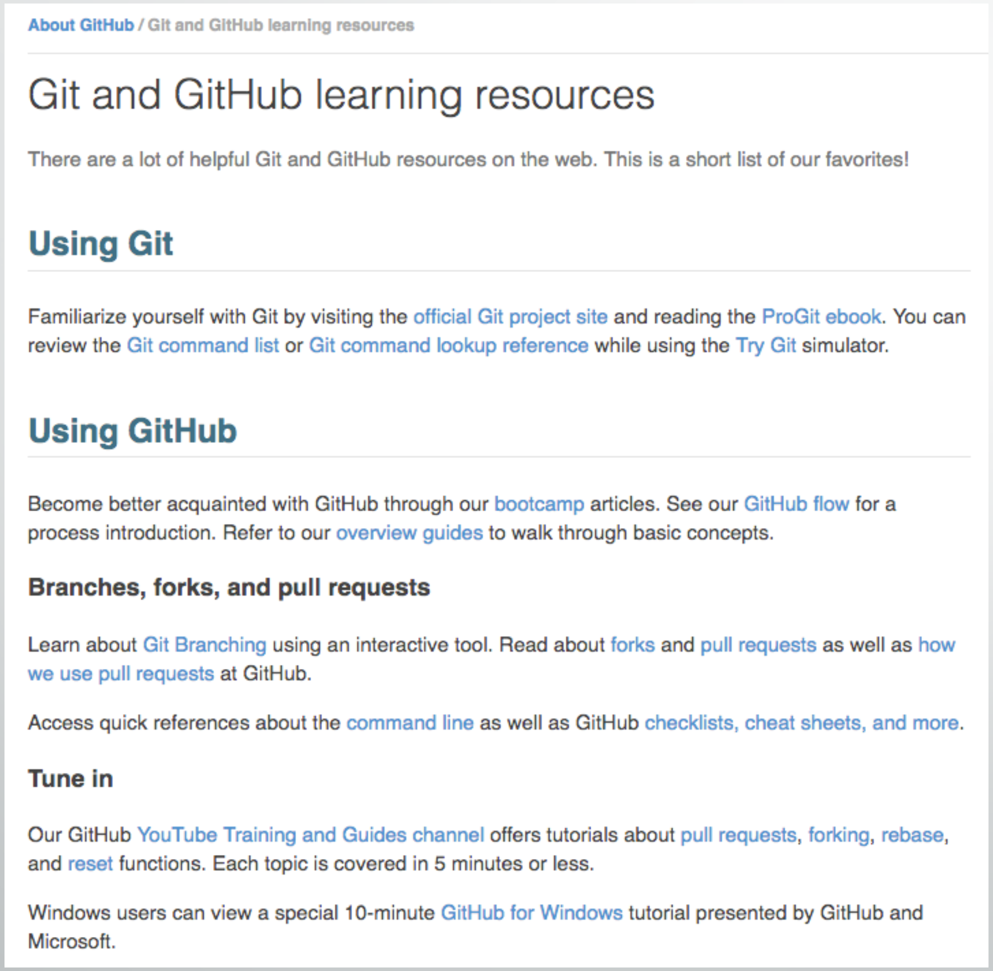
```
Press enter to submit commands

>
```

My Octobox Repository

https://try.github.io

# Getting Started



About GitHub / Git and GitHub learning resources

Git and GitHub learning resources

There are a lot of helpful Git and GitHub resources on the web. This is a short list of our favorites!

**Using Git**

Familiarize yourself with Git by visiting the official Git project site and reading the ProGit ebook. You can review the Git command list or Git command lookup reference while using the Try Git simulator.

**Using GitHub**

Become better acquainted with GitHub through our bootcamp articles. See our GitHub flow for a process introduction. Refer to our overview guides to walk through basic concepts.

**Branches, forks, and pull requests**

Learn about Git Branching using an interactive tool. Read about forks and pull requests as well as how we use pull requests at GitHub.

Access quick references about the command line as well as GitHub checklists, cheat sheets, and more.

**Tune in**

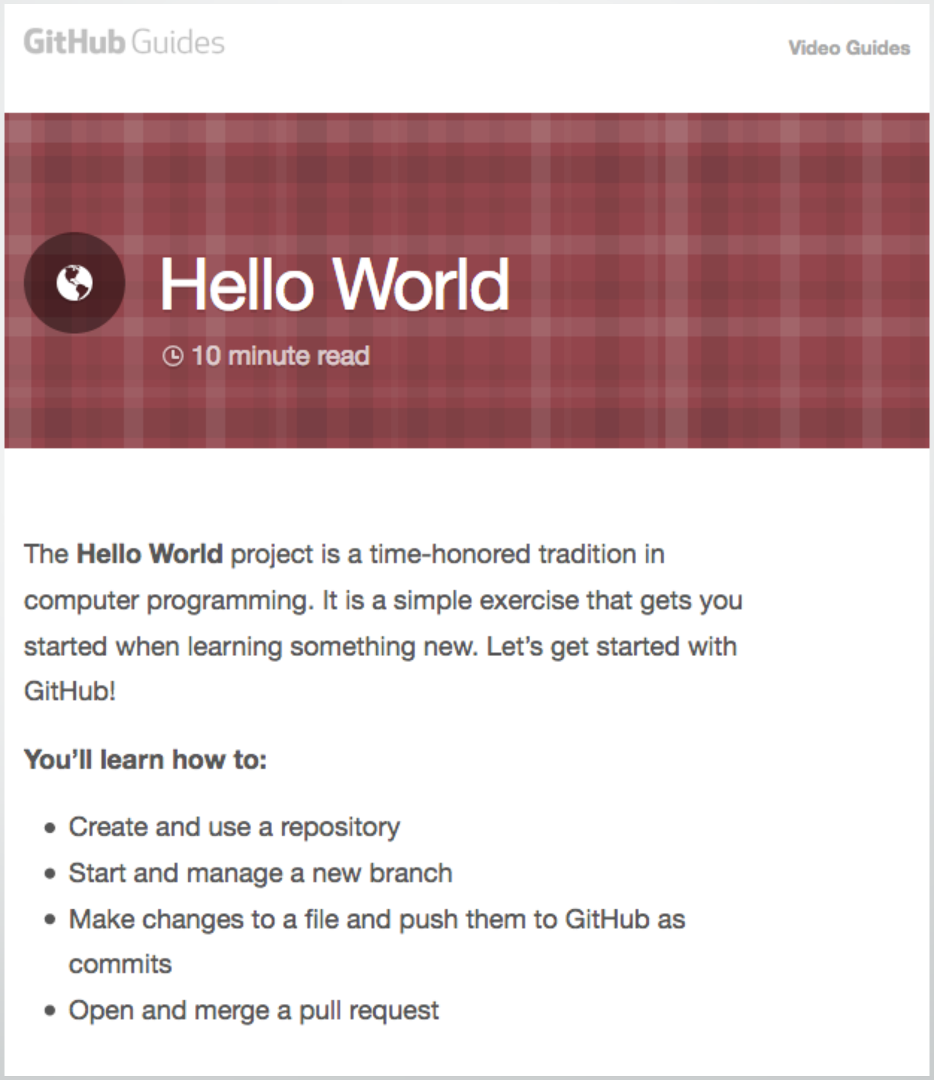
Our GitHub YouTube Training and Guides channel offers tutorials about pull requests, forking, rebase, and reset functions. Each topic is covered in 5 minutes or less.

Windows users can view a special 10-minute GitHub for Windows tutorial presented by GitHub and Microsoft.

https://help.github.com/articles/git-and-github-learning-resources/

## “Hello World” Demo on GitHub

*Resources for learning Git and GitHub*



The **Hello World** project is a time-honored tradition in computer programming. It is a simple exercise that gets you started when learning something new. Let’s get started with GitHub!

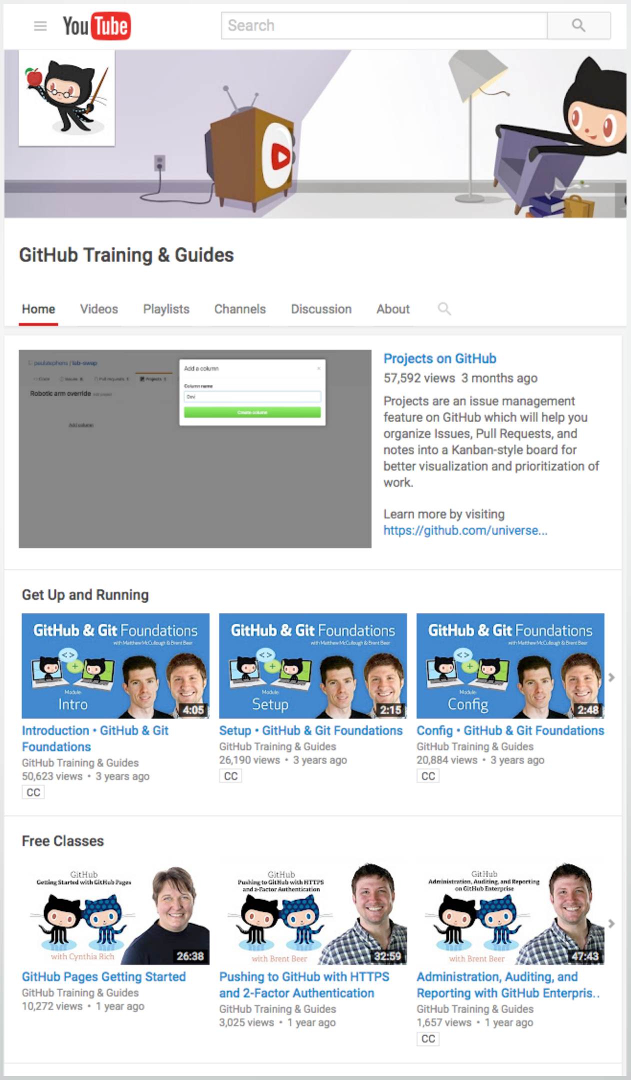
**You’ll learn how to:**

- Create and use a repository
- Start and manage a new branch
- Make changes to a file and push them to GitHub as commits
- Open and merge a pull request

https://guides.github.com/activities/hello-world/

## "GitHub" Channel on YouTube

*Resources for learning Git and GitHub*



Projects on GitHub
57,592 views 3 months ago
Projects are an issue management feature on GitHub which will help you organize Issues, Pull Requests, and notes into a Kanban-style board for better visualization and prioritization of work.

Learn more by visiting https://github.com/universe...

Get Up and Running

Introduction • GitHub & Git Foundations
GitHub Training & Guides
50,623 views • 3 years ago
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Setup • GitHub & Git Foundations
GitHub Training & Guides
26,190 views • 3 years ago
CC

Config • GitHub & Git Foundations
GitHub Training & Guides
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Free Classes

GitHub Pages Getting Started
GitHub Training & Guides
10,272 views • 1 year ago

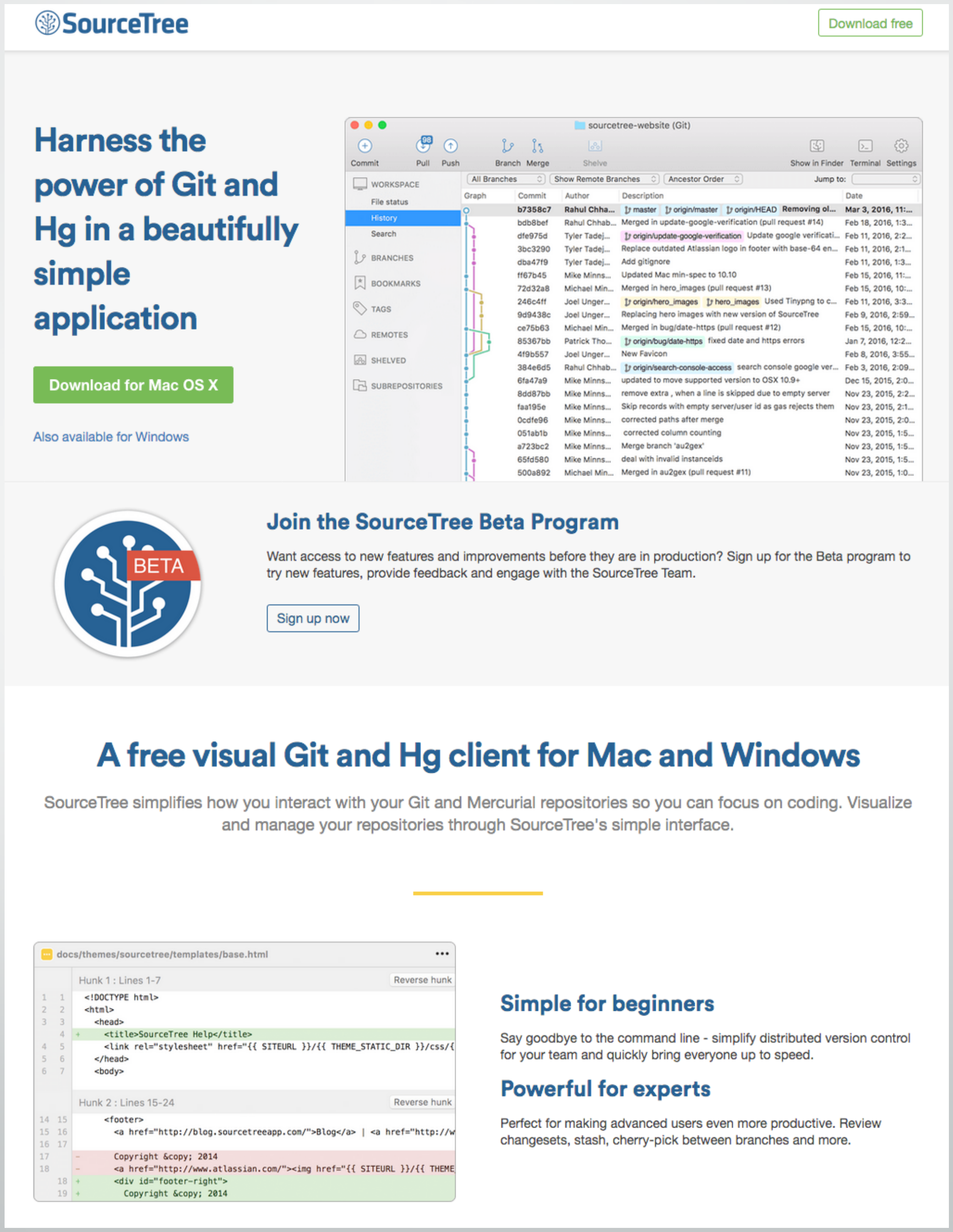
Pushing to GitHub with HTTPS and 2-Factor Authentication
GitHub Training & Guides
3,025 views • 1 year ago

Administration, Auditing, and Reporting with GitHub Enterpris..
GitHub Training & Guides
1,657 views • 1 year ago
CC

https://www.youtube.com/githubguides

## Source Tree

- Git and GitHub can be used entirely from the command line.
- But, there are many GUI implementations of Git. The one I use is called SourceTree
- Personally, I'm not a fan of the GitHub desktop application



### Harness the power of Git and Hg in a beautifully simple application

Download for Mac OS X

Also available for Windows

sourcetree-website (Git)

| Commit | Author | Description | Date |
|---|---|---|---|
| b7358c7 | Rahul Chha... | master origin/master origin/HEAD Removing ol... | Mar 3, 2016, 11:... |
| bdb8bef | Rahul Chhab... | Merged in update-google-verification (pull request #14) | Feb 18, 2016, 1:3... |
| dfe975d | Tyler Tadej... | origin/update-google-verification Update google verificati... | Feb 11, 2016, 2:2... |
| 3bc3290 | Tyler Tadej... | Replace outdated Atlassian logo in footer with base-64 en... | Feb 11, 2016, 2:1... |
| dba47f9 | Tyler Tadej... | Add gitignore | Feb 11, 2016, 1:3... |
| ff67b45 | Mike Minns... | Updated Mac min-spec to 10.10 | Feb 15, 2016, 11:... |
| 72d32a8 | Michael Min... | Merged in hero_images (pull request #13) | Feb 15, 2016, 10:... |
| 246c4ff | Joel Unger... | origin/hero_images hero_images Used Tinypng to c... | Feb 11, 2016, 3:3... |
| 9d9438c | Joel Unger... | Replacing hero images with new version of SourceTree | Feb 9, 2016, 2:59... |
| ce75b63 | Michael Min... | Merged in bug/date-https (pull request #12) | Feb 15, 2016, 10:... |
| 85367bb | Patrick Tho... | origin/bug/date-https fixed date and https errors | Jan 7, 2016, 12:2... |
| 4f9b557 | Joel Unger... | New Favicon | Feb 8, 2016, 3:55... |
| 384e6d5 | Rahul Chhab... | origin/search-console-access search console google ver... | Feb 3, 2016, 2:09... |
| 6fa47a9 | Mike Minns... | updated to move supported version to OSX 10.9+ | Dec 15, 2015, 2:0... |
| 8dd87bb | Mike Minns... | remove extra , when a line is skipped due to empty server | Nov 23, 2015, 2:2... |
| faa195e | Mike Minns... | Skip records with empty server/user id as gas rejects them | Nov 23, 2015, 2:1... |
| 0cdfe96 | Mike Minns... | corrected paths after merge | Nov 23, 2015, 2:0... |
| 051ab1b | Mike Minns... | corrected column counting | Nov 23, 2015, 1:5... |
| a723bc2 | Mike Minns... | Merge branch 'au2gex' | Nov 23, 2015, 1:5... |
| 65fd580 | Mike Minns... | deal with invalid instanceids | Nov 23, 2015, 1:5... |
| 500a892 | Michael Min... | Merged in au2gex (pull request #11) | Nov 23, 2015, 1:0... |

### Join the SourceTree Beta Program

BETA

Want access to new features and improvements before they are in production? Sign up for the Beta program to try new features, provide feedback and engage with the SourceTree Team.

Sign up now

### A free visual Git and Hg client for Mac and Windows

SourceTree simplifies how you interact with your Git and Mercurial repositories so you can focus on coding. Visualize and manage your repositories through SourceTree's simple interface.

docs/themes/sourcetree/templates/base.html

Hunk 1 : Lines 1-7 — Reverse hunk

```
  <!DOCTYPE html>
  <html>
    <head>
+     <title>SourceTree Help</title>
      <link rel="stylesheet" href="{{ SITEURL }}/{{ THEME_STATIC_DIR }}/css/{
    </head>
    <body>
```

Hunk 2 : Lines 15-24 — Reverse hunk

```
      <footer>
        <a href="http://blog.sourcetreeapp.com/">Blog</a> | <a href="http://w

-       Copyright &copy; 2014
-       <a href="http://www.atlassian.com/"><img href="{{ SITEURL }}/{{ THEME
+       <div id="footer-right">
+         Copyright &copy; 2014
```

### Simple for beginners

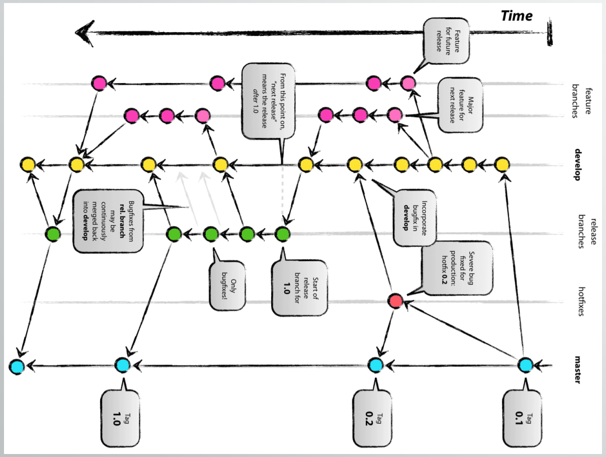
Say goodbye to the command line - simplify distributed version control for your team and quickly bring everyone up to speed.

### Powerful for experts

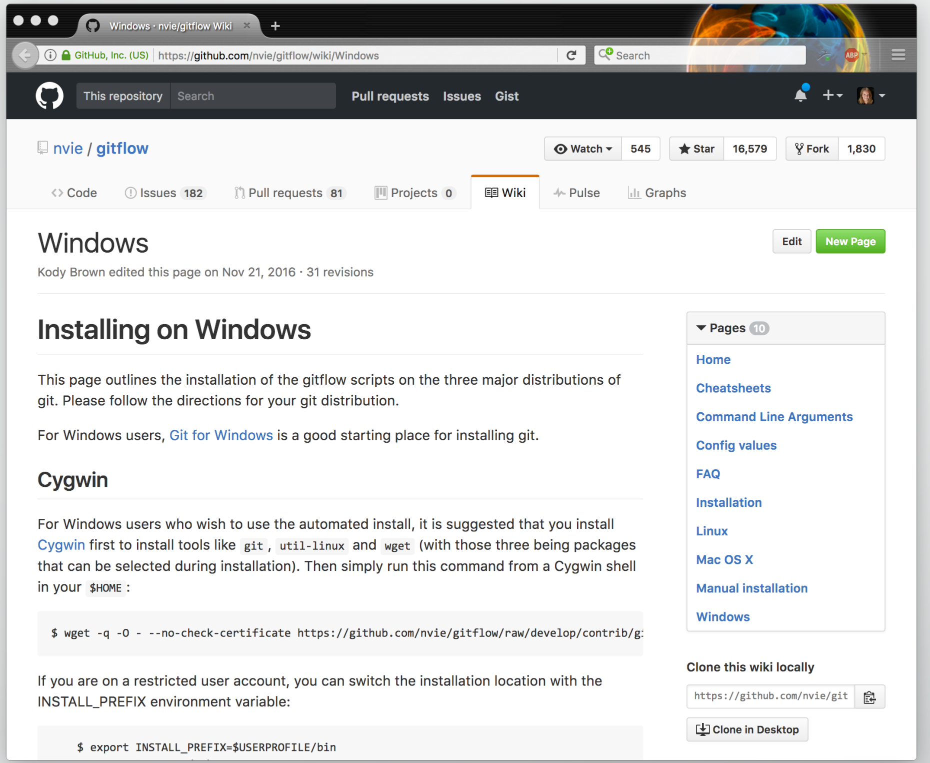
Perfect for making advanced users even more productive. Review changesets, stash, cherry-pick between branches and more.

# Gitflow

git-flow are a set of git extensions to provide high-level repository operations for Vincent Driessen's (nvie) branching model.



Time
Feature for future release
From this point on, "next release" means the release after 1.0
Major feature for next release
feature branches
develop
Bugfixes from rel. branch may be continuously merged back into develop
Incorporate bugfix in develop
release branches
Only bugfixes!
Start of release branch for 1.0
Severe bug fixed for production: hotfix 0.2
hotfixes
master
Tag 1.0
Tag 0.2
Tag 0.1



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Kody Brown edited this page on Nov 21, 2016 · 31 revisions

## Installing on Windows

This page outlines the installation of the gitflow scripts on the three major distributions of git. Please follow the directions for your git distribution.

For Windows users, Git for Windows is a good starting place for installing git.

### Cygwin

For Windows users who wish to use the automated install, it is suggested that you install Cygwin first to install tools like `git`, `util-linux` and `wget` (with those three being packages that can be selected during installation). Then simply run this command from a Cygwin shell in your `$HOME`:

```
$ wget -q -O - --no-check-certificate https://github.com/nvie/gitflow/raw/develop/contrib/g
```

If you are on a restricted user account, you can switch the installation location with the INSTALL_PREFIX environment variable:

```
  $ export INSTALL_PREFIX=$USERPROFILE/bin
```

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Clone this wiki locally

https://github.com/nvie/git

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https://github.com/nvie/gitflow/wiki/

http://nvie.com/posts/a-successful-git-branching-model/

Thank You