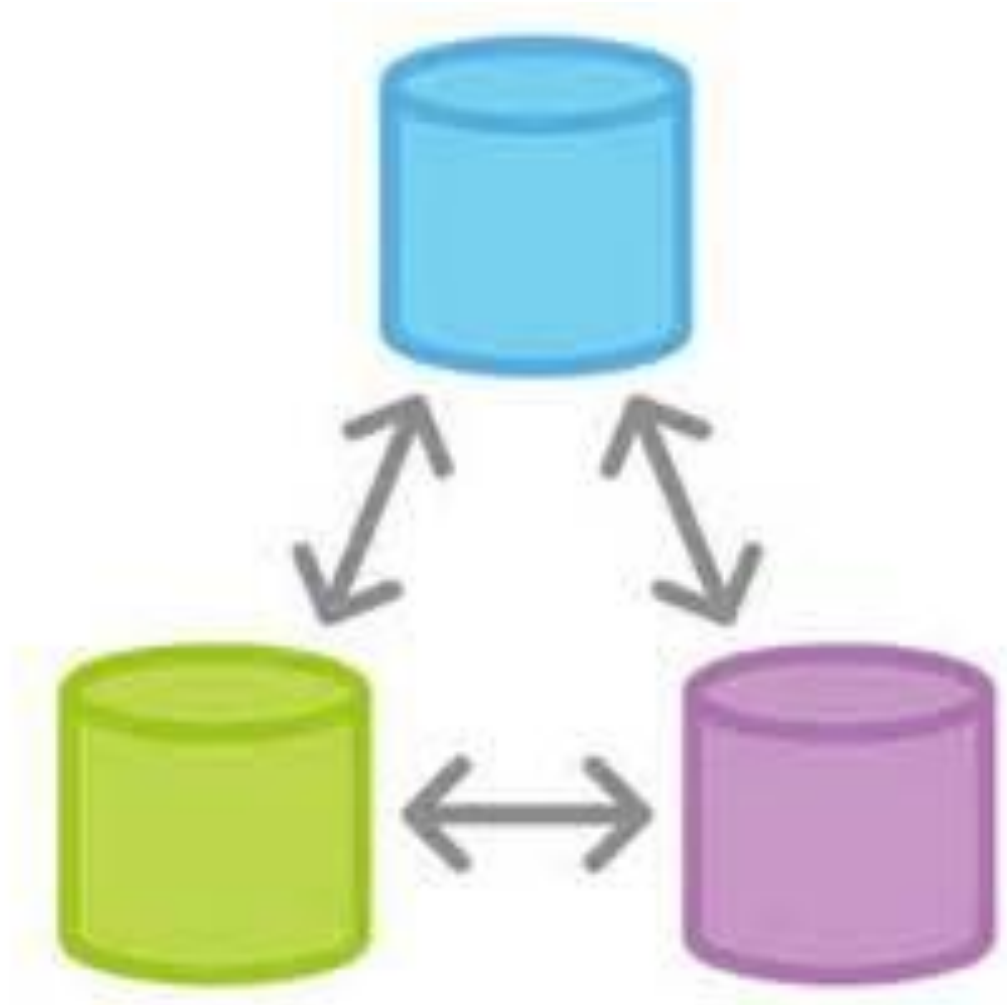


Lecture 5 Remotes



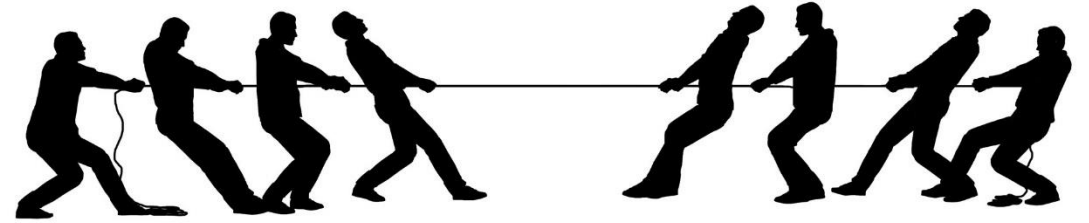
**Sign in on the
attendance
sheet!**

Announcements

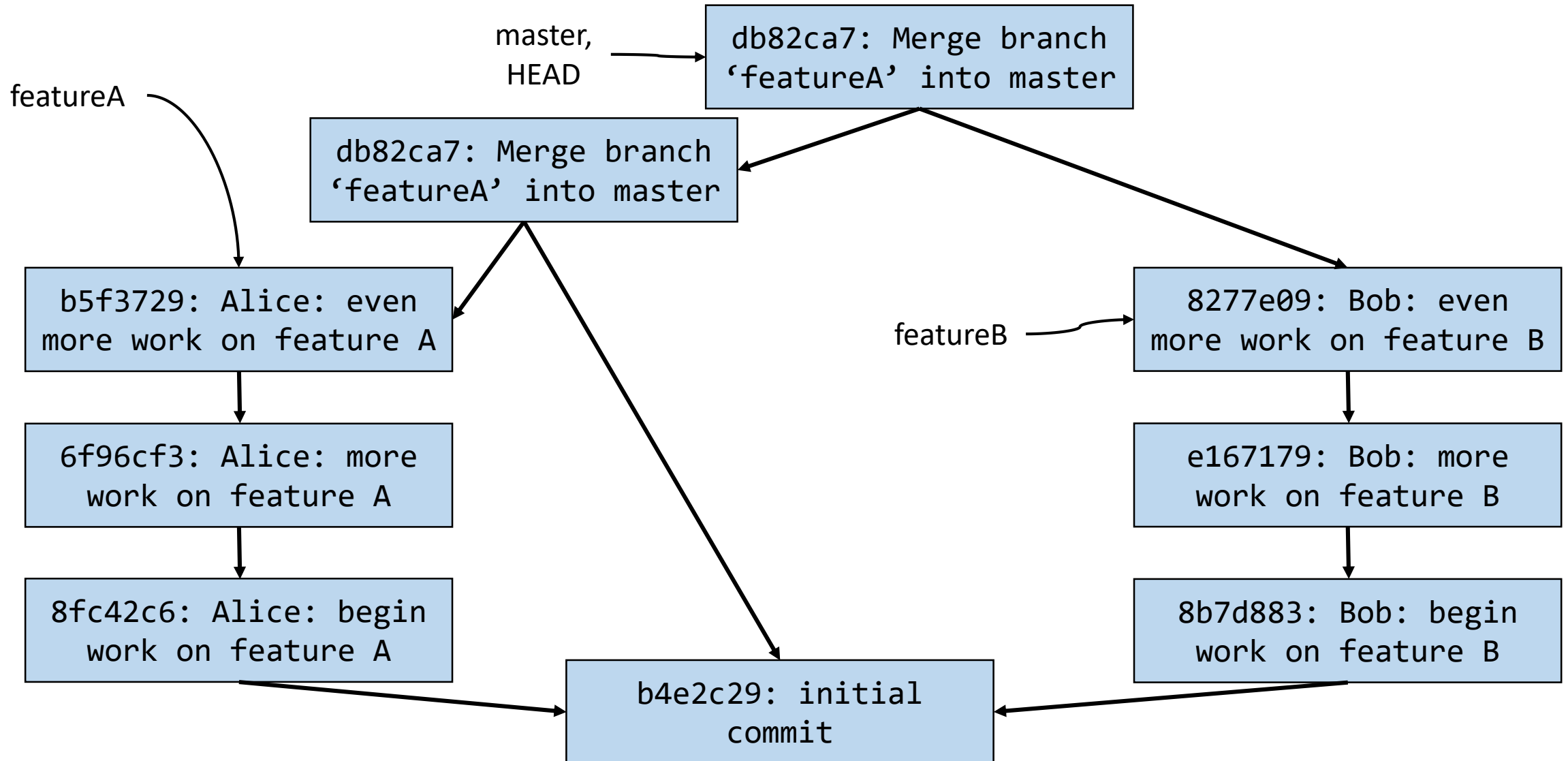
- Midterm in-class next week (2/21)
 - Git commands we have learned: init, clone, log, show, diff, checkout, reset, branch, merge, fetch, pull, push, remote
 - Mental model for how git works: the working directory, staging area (index), commit log, diffs, branches (local and remote)
- Homework submissions will be through Autolab
- Thanks for filling out the survey!
 - More practical questions on the homeworks
 - More live examples during class
 - Keep doing the group activities at the end of class

Today

- Remotes
- `git remote`
- `git fetch`
- `git pull`
- `git push`
- Github



Last Time: Branches



Scenario: Alice, Bob, and Charlie collaborate on a project, but each on their own computer

8fc42c6: heapchecker
no longer infloops



b4e2c29: initial
commit

Alice

8fc42c6: heapchecker
no longer infloops



b4e2c29: initial
commit

Bob

8fc42c6: heapchecker
no longer infloops



b4e2c29: initial
commit

Charlie

Scenario: Alice, Bob, and Charlie collaborate on a project, but each on their own computer

6f96cf3: don't create headers in free blocks



8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Alice

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Bob

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Charlie

Scenario: Alice, Bob, and Charlie collaborate on a project, but each on their own computer

How does Alice get commit 6f96cf3 to Bob and Charlie?

6f96cf3: don't create headers in free blocks



8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Alice

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Bob

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Charlie

Scenario: Alice, Bob, and Charlie collaborate on a project, but each on their own computer

How does Alice get commit 6f96cf3 to Bob and Charlie?

Idea 1: Bob and Charlie each **fetch** the commit from Alice.

Idea 2: Alice pushes the commit to Bob and Charlie.

6f96cf3: don't create headers in free blocks



8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Alice

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Bob

8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Charlie

Fetching

1. Tell git to set up Alice's repository as a "remote repository" or a "remote". This only happens once.
2. Tell git to download the commits from the remote repository.



STEP 1

```
git remote add <remotename> <remoteurl>
```

Example use:

```
git remote add origin aperley@unix.andrew.cmu.edu:~/mygitrepo
```

- Adds a remote repository called “origin” located at `aperley@unix.andrew.cmu.edu:~/mygitrepo` (through SSH)
- “origin” is the default name for a remote, since often times the first remote you have is the one you clone from
- If you created the repository using `git clone` (rather than `git init`), the repository you cloned from is called “origin”

git remote -v

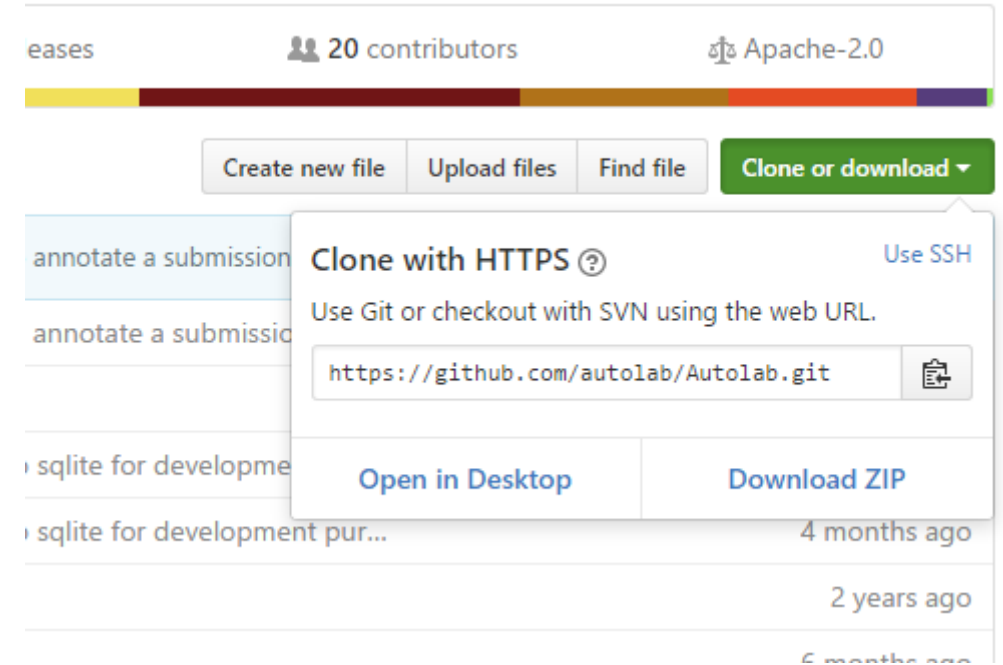
- Verbosely lists all your remotes:

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab
$ git remote -v
origin https://github.com/autolab/AutoLab.git (fetch)
origin https://github.com/autolab/AutoLab.git (push)
```

- Each remote has a fetch and push url. They are almost always the same.

Git Remote URLs

- 4 choices: HTTPS, SSH, local, git



- HTTPS: git objects and commits are transferred over web protocols. Pretty easy to set up, unless you need authentication.
- SSH: git objects and commits are transferred over the SSH protocol. Requires a ssh daemon to be running, allows authentication.

STEP 2

```
git fetch <remotename>
```

Example use:

```
git fetch origin
```



- **Downloads** and **updates** all branches published by the remote
- Stores these branches as <remotename>/<branchname>
- Does NOT affect your own branches, like master!

Listing Remote Branches

- `git branch -r` (only remote) or `git branch -a` (all branches)

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git branch -a
* master
my-feature
remotes/origin/AutoLab2.0
remotes/origin/HEAD -> origin/master
remotes/origin/add-mysql-gem
remotes/origin/assessment-page-redesign
remotes/origin/assessment_page_v2
remotes/origin/assessment_statistics_upgrade
remotes/origin/cg2v-new-master
remotes/origin/change-labtemplate-image
remotes/origin/change-test-database
remotes/origin/course_settings_redesign
remotes/origin/develop
```

How do you actually bring in the remote changes?

6f96cf3: don't create headers in free blocks



8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Alice

6f96cf3: don't create headers in free blocks



8fc42c6: heapchecker no longer infloops



b4e2c29: initial commit

Bob

How do you actually **merge** in the remote changes?

Scenario: Working on the Autolab Project, want to update **my master branch** to origin/master.



Everything is a branch!

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/Autolab (master)
$ git status
On branch master
Your branch is up-to-date with 'origin/master'.

nothing to commit, working directory clean
```


How do you actually **merge** in the remote changes?

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git fetch origin
remote: Counting objects: 1672, done.
remote: Compressing objects: 100% (271/271), done.
remote: Total 1672 (delta 967), reused 830 (delta 830), pack-reused 571
Receiving objects: 100% (1672/1672), 330.67 KiB | 161.00 KiB/s, done.
Resolving deltas: 100% (1235/1235), completed with 167 local objects.
From https://github.com/autolab/AutoLab
   5a4b0eb..7dc9f0e  master       -> origin/master
   a6b0d4c..e95bd89  AutoLab2.0 -> origin/AutoLab2.0
* [new branch]      MikeDrewitt-ub_blue -> origin/MikeDrewitt-ub_blue
* [new branch]      Updated-Mac-Installation -> origin/Updated-Mac-Installation
* [new branch]      annotations_page_instructions -> origin/annotations_page_instr
actions
* [new branch]      assignment_name_missing_from_submission_downloads -> origin/as
signment_name_missing_from_submission_downloads
   d45ee7a..06b2021  course_settings_redesign -> origin/course_settings_redesign
* [new branch]      fix_sign_in_page -> origin/fix_sign_in_page
* [new branch]      gradebook_changes -> origin/gradebook_changes
* [new branch]      non_exist_course_404_error -> origin/non_exist_course_404_erro
r
* [new branch]      school_specific_config -> origin/school_specific_config
* [new branch]      setup_scripts -> origin/setup_scripts
* [new branch]      stats_fixes -> origin/stats_fixes
+ b550847...3501c70  tj johans_edits -> origin/tj johans_edits (forced update)
* [new branch]      tj johans_edits_inter -> origin/tj johans_edits_inter
* [new tag]         v2.0.0 -> v2.0.0
```

Step 1: git fetch origin

How do you actually **merge** in the remote changes?

Git knows that master and origin/master are associated (more on this later), and that master can be fast-forwarded up to origin/master

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git status
On branch master
Your branch is behind 'origin/master' by 11 commits, and can be fast-forwarded.
  (use "git pull" to update your local branch)

nothing to commit, working directory clean
```

How do you actually
merge in the
remote changes?

```
$ git log --graph --oneline \  
--decorate --branches \  
--remotes
```

```
* 6fc842e (origin/Updated-Mac-Installation) Update README.md  
* 41788be Update README.md  
* d42c7f0 Create start.sh  
* 301714a Update README.md  
* 48b0ed6 Update README.md  
* 639295f Update README.md  
* 7e6628b Update readme.md  
| * 7dcaf0e (origin/master, origin/HEAD) Updated message to properly inform how  
| * 75fe498 Rename files to include assignment name on download. Fixes #693. (#  
| * 3d32d55 Fix Issue #757: CUD creation now explains problem (#769)  
|  
| * 9f116a6 (origin/tjjohans_edits_inter) Issue #757: Removed unnecessary comm  
| * c434de5 Fix Issue #757: CUD creation now explains problem  
| | * e6d9152 (origin/setup_scripts) Fixed gem dependencies in setup-OSX script  
| | * 1fe46cf Finished OSX shell setup script.  
| | * 4e075f2 Command to get the DB template setup for sqlite  
| | * c402c87 Added primitive OSX setup script  
|  
| * 4617769 (origin/annotations_page_instructions) Updated message to properl  
|  
| * ea3905c Attachments#show should use an absolute path (#751)  
| * 7157619 Non exist course 404 error (#768)  
|  
| * 715fd98 (origin/assignment_name_missing_from_submission_downloads) Rename f  
|  
| * 3501c70 (origin/tjjohans_edits) Fix Issue #757: CUD creation error explains  
| * 3da997c Issue #763 - fix saved_work = false bug  
| * 89d7b42 Issue #763 - implement requests  
| * 6ee1c59 Fix Issue #763: Existent Email Error  
|  
| * cf5f6e3 Fix Issue #763: Duplicate email error not caught (#765)  
| * e129f4a Validate course name  
| * 57cda54 Adapt to new roster format (#726)  
| * 395ef12 Use Rails.root.join everywhere (#752)  
| * 573fbe8 Fix Issue #546: Absolute Directory (#759)  
| * b549dd1 Make search experience consistent (#663)  
| | * abbd4c5 (origin/non_exist_course_404_error) When a course is not found, pre  
| | * cc88618 When a course is not found, present a 404 error instead of a 500 er  
|  
| * 5a4b0eb (HEAD, tag: v2.0.0, my-feature, master) Fix Issue #710: Version Penal  
| * 135867b Fix issue #609: 'Edit Information' button visible  
| * 652d0f9 Fix numbering issue  
| * 2eae45f Remove references to `develop` branch  
| | * 20274fd (origin/stats_fixes) Remove plot graphs (will re-add in v2)  
| | * 1d983b3 Change plotly version
```

How do you actually **merge** in the remote changes?

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git merge origin/master
Updating 5a4b0eb..7dcaf0e
Fast-forward
 app/assets/stylesheets/style.css.scss          | 7 +-
 app/controllers/application_controller.rb       | 5 +-
 app/controllers/assessment/grading.rb         | 3 +-
 app/controllers/assessments_controller.rb     | 7 +-
 app/controllers/attachments_controller.rb     | 2 +-
 app/controllers/course_user_data_controller.rb | 14 ++--
 app/controllers/courses_controller.rb        | 77 ++++++++-----
 app/controllers/extensions_controller.rb      | 2 +-
 app/controllers/submissions_controller.rb     | 22 +++---
 app/controllers/users_controller.rb          | 19 ++++-
 app/models/course.rb                          | 21 +++---
 app/models/submission.rb                      | 5 +-
 ../assessments/_submission_summary_row.html.erb | 8 +--
 app/views/assessments/installAssessment.html.erb | 3 +-
 app/views/course_user_data/new.html.erb      | 17 +++--
 app/views/extensions/index.html.erb          | 4 +-
 app/views/submissions/index.html.erb         | 3 +-
 app/views/submissions/new.html.erb           | 2 +-
 app/views/submissions/view.html.erb          | 12 ++--
 lib/tasks/autolab.rake                       | 20 +++---
20 files changed, 146 insertions(+), 107 deletions(-)
```

Step 2:
git merge origin/master

```

* 6fc842e (origin/Updated-Mac-Installation) Update README.md
* 41788be Update README.md
* d42c7f0 Create start.sh
* 301714a Update README.md
* 48b0ed6 Update README.md
* 639295f Update README.md
* 7e6628b Update readme.md
* 7dcaf0e (origin/master, origin/HEAD) Updated message to properly inform how
* 75fe498 Rename files to include assignment name on download. Fixes #693. (#
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* 1fe46cf Finished OSX shell setup script.
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* 3501c70 (origin/tjjohans_edits) Fix Issue #757: CUD creation error explains
* 3da997c Issue #763 - fix saved_work = false bug
* 89d7b42 Issue #763 - implement requests
* 6ee1c59 Fix Issue #763: Existent Email Error
//
* cf5f6e3 Fix Issue #763: Duplicate email error not caught (#765)
* e129f4a Validate course name
* 57cda54 Adapt to new roster format (#726)
* 395ef12 Use Rails.root.join everywhere (#752)
* 573fbe8 Fix Issue #546: Absolute Directory (#759)
* b549dd1 Make search experience consistent (#663)
* abbd4c5 (origin/non_exist_course_404_error) When a course is not found, pre
* cc88618 When a course is not found, present a 404 error instead of a 500 er
//
* 5a4b0eb (HEAD, tag: v2.0.0, my-feature, master) Fix Issue #710: Version Penal
* 135867b Fix issue #609: 'Edit Information' button visible
* 652d0f9 Fix numbering issue
* 2eae45f Remove references to `develop` branch
* 20274fd (origin/stats_fixes) Remove plot graphs (will re-add in v2)
* 1d983b3 Change plotly version

```

Before Merge

```

* e61796a Redesign assessment page with cleaner UI
* c45107e Fix UI and navbar errors on assessment statistics page (#762)
* 6fc842e (origin/Updated-Mac-Installation) Update README.md
* 41788be Update README.md
* d42c7f0 Create start.sh
* 301714a Update README.md
* 48b0ed6 Update README.md
* 639295f Update README.md
* 7e6628b Update readme.md
* 7dcaf0e (HEAD, origin/master, origin/HEAD, master) Updated message to prop
* 75fe498 Rename files to include assignment name on download. Fixes #693. (#
* 3d32d55 Fix Issue #757: CUD creation now explains problem (#769)
//
* 9f116a6 (origin/tjjohans_edits_inter) Issue #757: Removed unnecessary comme
* c434de5 Fix Issue #757: CUD creation now explains problem
* e6d9152 (origin/setup_scripts) Fixed gem dependencies in setup-OSX script
* 1fe46cf Finished OSX shell setup script.
* 4e075f2 Command to get the DB template setup for sqlite
* c402c87 Added primitive OSX setup script
//
* 4617769 (origin/annotations_page_instructions) Updated message to properl
//
* ea3905c Attachments#show should use an absolute path (#751)
* 7157619 Non exist course 404 error (#768)
//
* 715fd98 (origin/assignment_name_missing_from_submission_downloads) Rename f
//
* 3501c70 (origin/tjjohans_edits) Fix Issue #757: CUD creation error explains
* 3da997c Issue #763 - fix saved_work = false bug
* 89d7b42 Issue #763 - implement requests
* 6ee1c59 Fix Issue #763: Existent Email Error
//
* cf5f6e3 Fix Issue #763: Duplicate email error not caught (#765)
* e129f4a Validate course name
* 57cda54 Adapt to new roster format (#726)
* 395ef12 Use Rails.root.join everywhere (#752)
* 573fbe8 Fix Issue #546: Absolute Directory (#759)
* b549dd1 Make search experience consistent (#663)
* abbd4c5 (origin/non_exist_course_404_error) When a course is not found, pre
* cc88618 When a course is not found, present a 404 error instead of a 500 er
//
* 5a4b0eb (tag: v2.0.0, my-feature) Fix Issue #710: Version Penalty
* 135867b Fix issue #609: 'Edit Information' button visible
* 652d0f9 Fix numbering issue
* 2eae45f Remove references to `develop` branch
* 20274fd (origin/stats_fixes) Remove plot graphs (will re-add in v2)

```

After Merge

```
git pull <remotename>
```

Example use:

```
git pull origin
```

- Runs `git fetch <remotename>`, then `git merge <remotename>/<currentbranch>`
- Ex: runs `git fetch origin`, then `git merge origin/master`

How do you checkout a branch on a remote repository?

Scenario: Working on the Autolab Project, want to take a look at a feature someone is developing on a separate branch.



Everything is a branch!

Default branch			
<code>master</code> Updated 13 days ago by jbman223	✓		Default

Active branches			
<code>MikeDrewitt-ub_blue</code> Updated 3 days ago by TheodorJ	✗	15 210	#778 Open
<code>school_specific_config</code> Updated 6 days ago by zyx-billy	✓	15 32	#777 Open
<code>Autolab2.0</code> Updated 6 days ago by zyx-billy	✓	15 29	Compare
<code>gradebook_changes</code> Updated 7 days ago by Jacob Buckheit	✓	15 33	Compare
<code>Updated-Mac-Installation</code> Updated 13 days ago by jbman223	✓	3 7	#771 Open

How do you checkout a branch on a remote repository?

Step 1: Figure out the branch name

```
$ git branch --list -r *gradebook*  
origin/gradebook_changes  
origin/gradebook_tooltip_fix
```


How do you checkout a branch on a remote repository?

Step 2: Create a local branch pointing to the same place as the remote branch

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git branch gradebook_changes origin/gradebook_changes
Branch gradebook_changes set up to track remote branch gradebook_changes from origin.
```

How do you checkout a branch on a remote repository?

Step 3: Checkout the local branch you just created

```
Aaron@HELIOS ~/Dropbox/Dropbox Documents/98174/AutoLab (master)
$ git checkout gradebook_changes
Switched to branch 'gradebook_changes'
Your branch is up-to-date with 'origin/gradebook_changes'.
```

```
git push <remotename> <branchname>
```

Example use:

```
git push origin master
```

- Updates the remote-tracking branch (<remotename>/<branchname>) and uploads the necessary commits for that branch to origin
- You must be fully up-to-date with the remote in order to push! Otherwise your push will be rejected.

What happens if you run `git push`?

- pushes current branch to origin (default remote) **git2.0 default**
- pushes all branches to origin (default remote) **pre-git2.0 default**
- `git config --global push.default simple`

Summary

- Configuring remotes:
 - `git remote [-v]` – lists remotes [verbosely]
 - `git remote add <remotename> <remoteurl>` - configure a new remote
 - `git branch -r` or `-a` – lists branches including remote tracking
- Fetching:
 - `git fetch <remotename>` - downloads updates to all remote-tracking branches to match the remote
 - `git pull <remotename>` - runs ``git fetch``, then merges in updates to the current branch
- Pushing:
 - `git push <remotename> <branchname>` - uploads changes in your branches to the remote

Activity!

Clone:

```
YOUR_ANDREW_ID@unix.andrew.cmu.edu:/afs/andrew.cmu.edu/course/98/174/public/lecture5-practice
```

Create a branch named `YOUR_ANDREW_ID`

And make a commit to it

Push the branch up to origin