MOOSE Development on GitHub

MOOSE Team

Idaho National Laboratory

June 5, 2014

- The latest version of these slides is always available from:

`https://mooseframework.org/static/media/uploads/docs/moose_github.pdf`

- The intended audience for this talk is people who will eventually commit code to MOOSE or one of its modules.

- Getting started *using* MOOSE on GitHub is pretty easy, either:

  1. Grab a ZIP archive of the code:

     `https://github.com/idaholab/moose/archive/devel.zip`

  2. Or clone the repository:

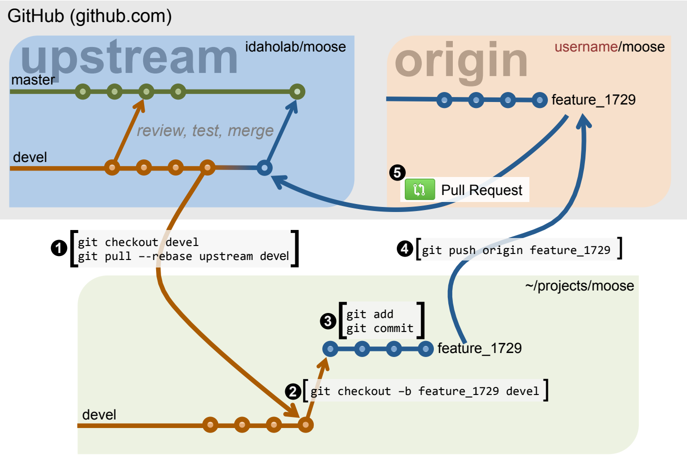
     ```
     git clone git@github.com:idaholab/moose.git
     ```

- This talk is divided into three main sections:
  - Setup – Commands you run one time, when getting started.
  - Workflow – Commands you'll run every time you develop on GitHub.
  - Basic git reference – You can ignore this if you are already familiar with git.
- We will issue all commands in a separate terminal as we go.
- Please ask questions at any time!

This talk assumes you:

- Already have a GitHub account.
- Have uploaded your public SSH key to GitHub, see: `https://help.github.com/articles/generating-ssh-keys`

- Primary MOOSE repository = “upstream”



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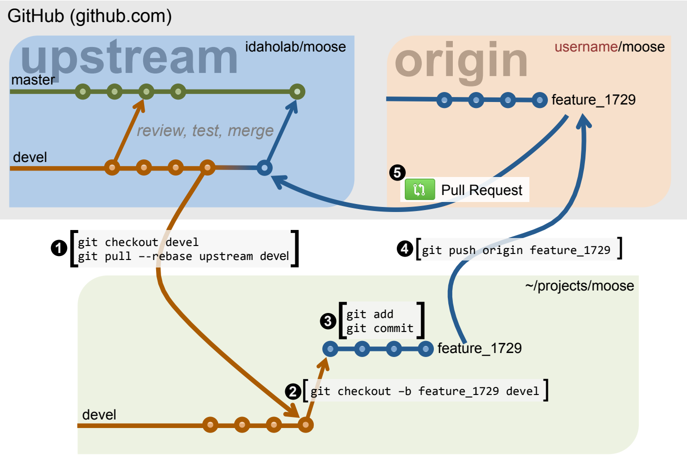
2
```
git checkout -b feature_1729 devel
```

3
```
git add
git commit
```

4
```
git push origin feature_1729
```

- Your personal fork of the MOOSE repository = “origin”



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4

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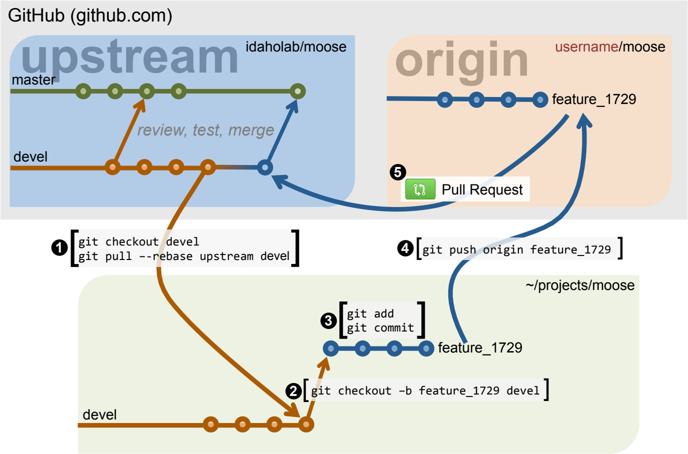
git push origin feature_1729
```

- The git clone of your fork = "∼/projects/moose"



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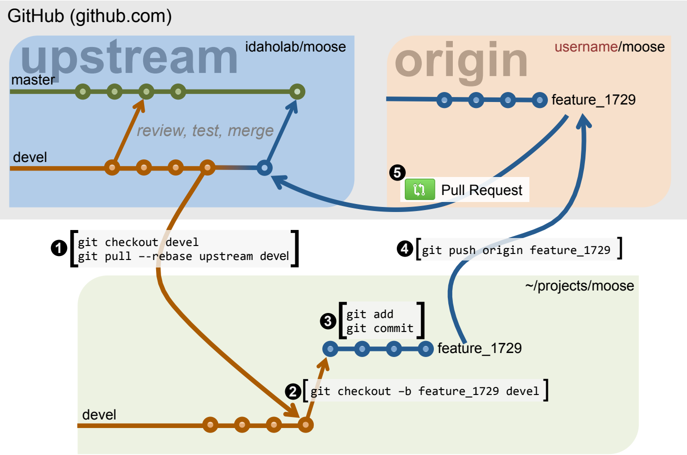
- We will refer back to this figure several times. . .



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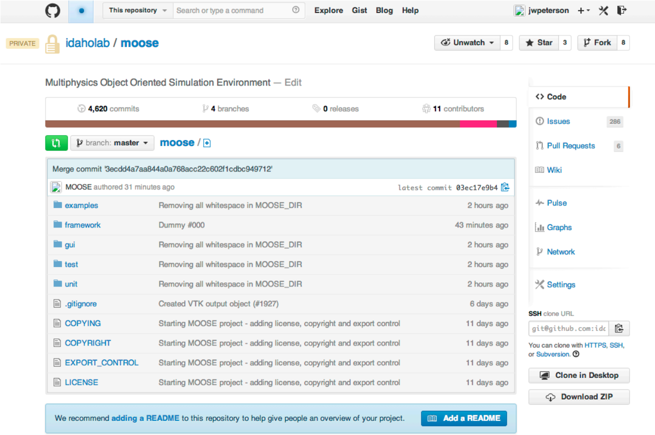
1 Introduction

2 Setup

3 Workflow

4 Basic git reference

1. Go to `https://github.com/idaholab/moose`
2. Click the Fork button.



Multiphysics Object Oriented Simulation Environment — Edit

4,620 commits · 4 branches · 0 releases · 11 contributors

Merge commit '3ecdd4a7aa844a0a768acc22c602f1cdbc949712'

MOOSE authored 31 minutes ago — latest commit 03ec17e9b4

examples	Removing all whitespace in MOOSE_DIR	2 hours ago
framework	Dummy #000	43 minutes ago
gui	Removing all whitespace in MOOSE_DIR	2 hours ago
test	Removing all whitespace in MOOSE_DIR	2 hours ago
unit	Removing all whitespace in MOOSE_DIR	2 hours ago
.gitignore	Created VTK output object (#1927)	6 days ago
COPYING	Starting MOOSE project - adding license, copyright and export control	11 days ago
COPYRIGHT	Starting MOOSE project - adding license, copyright and export control	11 days ago
EXPORT_CONTROL	Starting MOOSE project - adding license, copyright and export control	11 days ago
LICENSE	Starting MOOSE project - adding license, copyright and export control	11 days ago

We recommend adding a README to this repository to help give people an overview of your project.

SSH clone URL

`git@github.com:idc`

You can clone with HTTPS, SSH, or Subversion.

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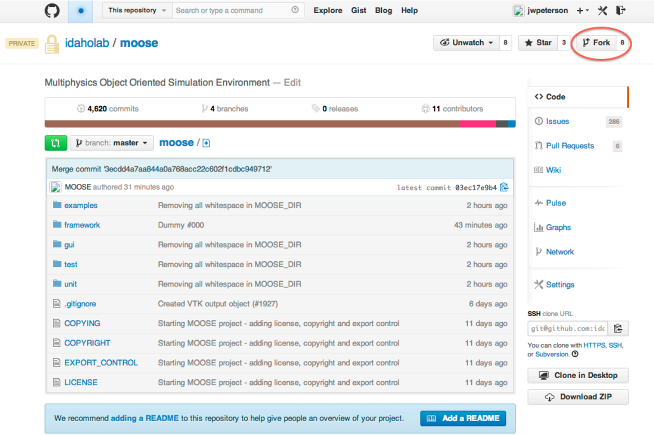
2. Click the Fork button.



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branch: master   moose / +

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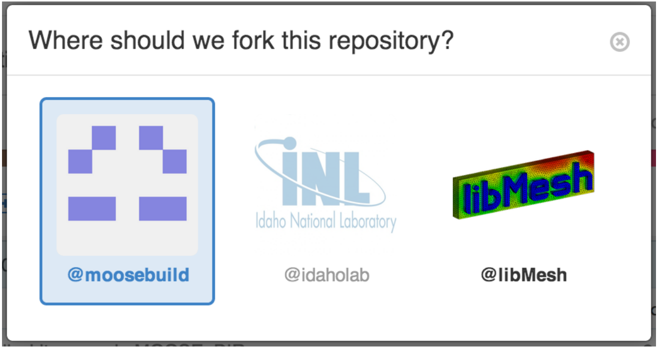
SSH clone URL

git@github.com:idc

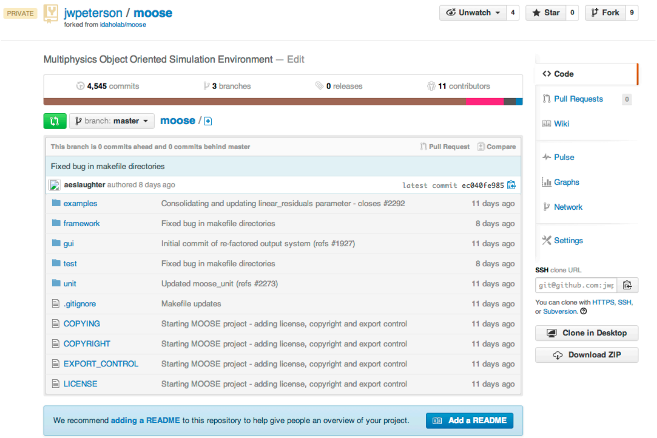
You can clone with HTTPS, SSH, or Subversion.

3 Choose your personal repository (@username) when prompted.



Where should we fork this repository?

1. Go to your fork, `https://github.com/username/moose`
2. In the top left, it should say: “forked from idaholab/moose”



PRIVATE jwpeterson / moose
forked from idaholab/moose

Unwatch ▾ 4 | ★ Star 0 | Fork 9

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branch: master ▾ | moose / +

This branch is 0 commits ahead and 0 commits behind master | Pull Request | Compare

Fixed bug in makefile directories

aeslaughter authored 8 days ago | latest commit ec040fe985

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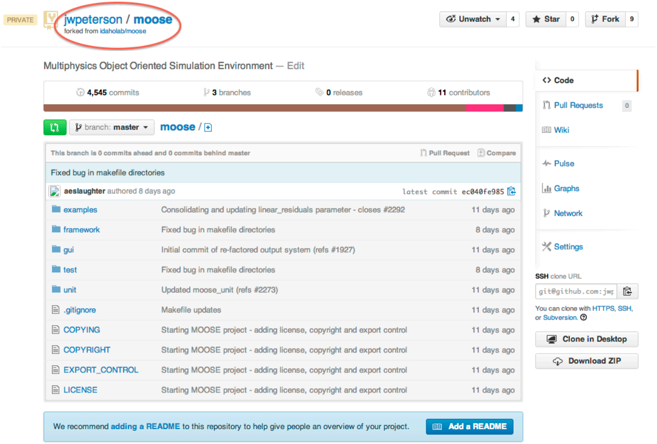
SSH clone URL
`git@github.com:jwp`

You can clone with HTTPS, SSH, or Subversion.

1. Go to your fork, `https://github.com/username/moose`
2. In the top left, it should say: “forked from idaholab/moose”



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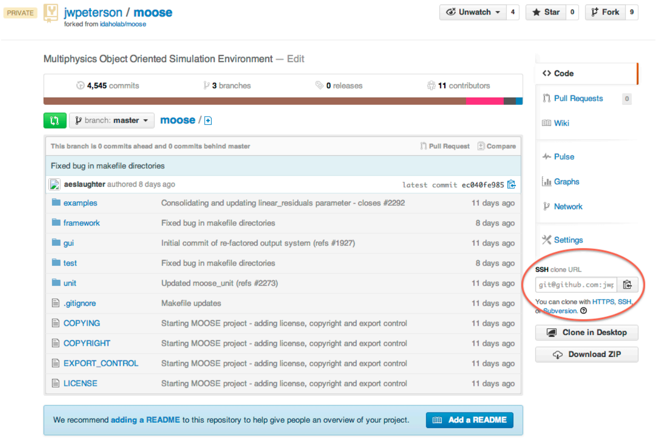
You can clone with HTTPS, SSH, or Subversion.

3. Click on the “SSH” link under settings.
4. Copy the URL, you will use it momentarily. . .



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SSH clone URL

`git@github.com:jwp`

You can clone with HTTPS, SSH, or Subversion.

5. Go to a terminal.

6.
   ```
   $ cd ~/projects
   ```

7.
   ```
   $ git clone git@github.com:username/moose.git
   ```

8.
   ```
   $ cd moose
   ```

9.
   ```
   $ git config user.name "Your Name"
   ```

10.
    ```
    $ git config user.email your_email@inl.gov
    ```
11. Take a look around, you should see:

    ```
    COPYING     COPYRIGHT     EXPORT_CONTROL
    LICENSE     examples/     framework/
    gui/        test/         unit/
    ```

```
$ git remote add upstream git@github.com:idaholab/moose.git
```

- Adding a remote allows you to stay up to date with MOOSE.
- The name “upstream” is standard in GitHub parlance, it refers to the “official” copy of MOOSE.
- As we shall later see, the name “origin” will refer to your personal fork. Your fork is where you can share your own changes to MOOSE!

1. Fork the MOOSE repository.
2. Make a clone of your fork.
3. Add a remote for the upstream MOOSE repository.

1 Introduction

2 Setup

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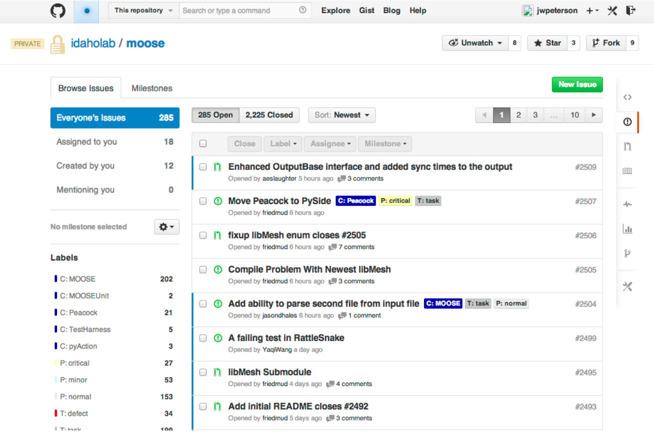
└Step 0: Create or pick an issue

- Visit `https://github.com/idaholab/moose/issues`
- You can click the "New Issue" button to start your own issue.



Everyone's Issues	285
Assigned to you	18
Created by you	12
Mentioning you	0

No milestone selected

Labels

C: MOOSE	202
C: MOOSEUnit	2
C: Peacock	21
C: TestHarness	5
C: pyAction	3
P: critical	27
P: minor	53
P: normal	153
T: defect	34
T: task	199

- □ Enhanced OutputBase interface and added sync times to the output — #2509
  Opened by aeslaughter 5 hours ago — 3 comments
- □ Move Peacock to PySide — C: Peacock — P: critical — T: task — #2507
  Opened by friedmud 6 hours ago
- □ fixup libMesh enum closes #2505 — #2506
  Opened by friedmud 6 hours ago — 7 comments
- □ Compile Problem With Newest libMesh — #2505
  Opened by friedmud 6 hours ago — 3 comments
- □ Add ability to parse second file from input file — C: MOOSE — T: task — P: normal — #2504
  Opened by jasondhales 6 hours ago — 1 comment
- □ A failing test in RattleSnake — #2499
  Opened by YaqiWang a day ago
- □ libMesh Submodule — #2495
  Opened by friedmud 4 days ago — 4 comments
- □ Add initial README closes #2492 — #2493
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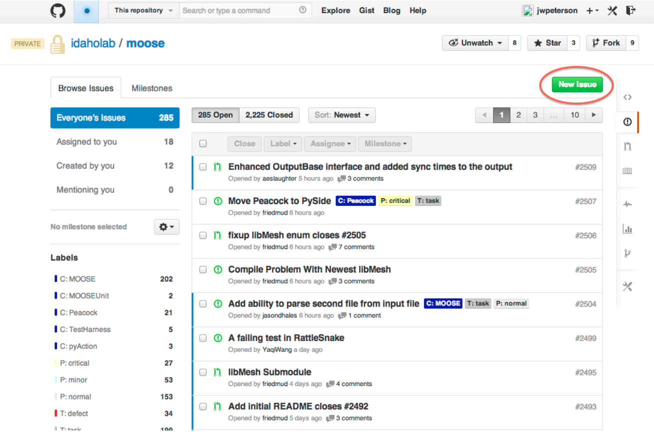

This repository ▾ | Search or type a command | Explore | Gist | Blog | Help | jwpeterson

PRIVATE idaholab / moose

Unwatch ▾ 8 | Star 3 | Fork 9

Browse Issues | Milestones | New Issue

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285 Open | 2,225 Closed | Sort: Newest ▾ | 1 2 3 … 10

□ | Close | Label ▾ | Assignee ▾ | Milestone ▾

Issue	Number
□ Enhanced OutputBase interface and added sync times to the output Opened by aeslaughter 5 hours ago 3 comments	#2509
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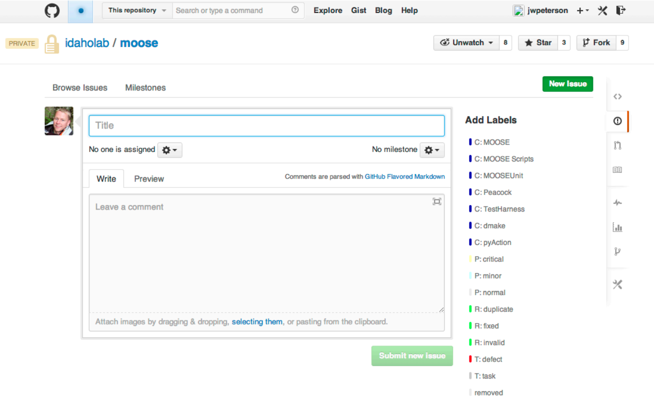
- Enter a title and brief description for the issue.
- Add labels if you can, this depends on permissions. . .



Comments are parsed with GitHub Flavored Markdown

Leave a comment

Attach images by dragging & dropping, selecting them, or pasting from the clipboard.

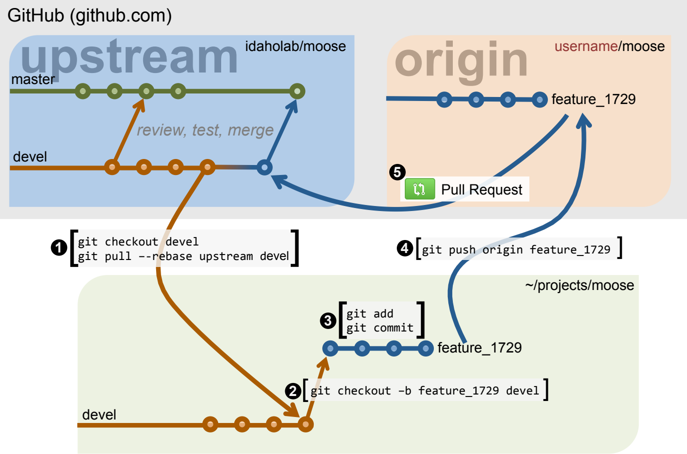
Add Labels

- C: MOOSE
- C: MOOSE Scripts
- C: MOOSEUnit
- C: Peacock
- C: TestHarness
- C: dmake
- C: pyAction
- P: critical
- P: minor
- P: normal
- R: duplicate
- R: fixed
- R: invalid
- T: defect
- T: task
- removed

- Change directories to where you cloned your fork, and run:

```
$ git checkout devel
$ git pull --rebase upstream devel
```

- The `--rebase` flag to `pull` is important! Don't forget it!
- Always do this before starting work to ensure you are up to date.



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git commit
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4

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git push origin feature_1729
```
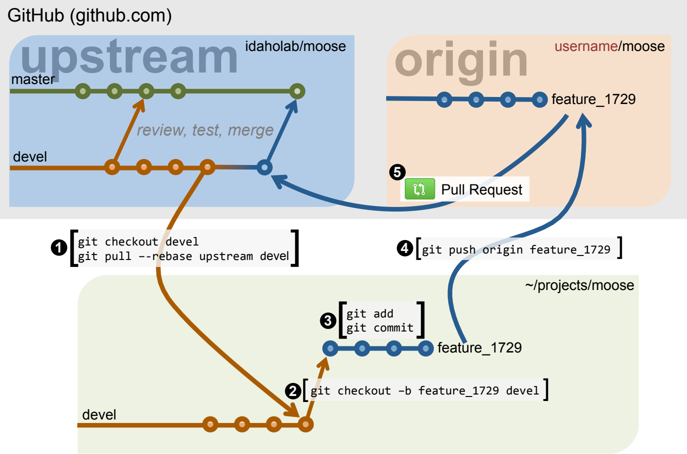

- Name your branch with your issue number, say #1729.
- Branch off from `devel`:

```
$ git checkout -b feature_1729 devel
```

- In the command above, `feature_1729` is the name of the branch being created.
- Branch names should always contain an appropriate issue number.



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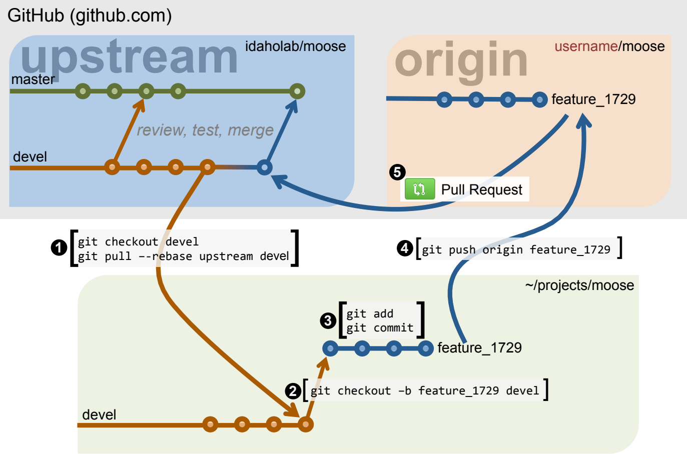
- This step is obviously specific to the problem at hand, but you will frequently use the commands:
  1. `git add`
     - Add "untracked" files.
  2. `git status`
     - Print a summary of what's changed.
  3. `git checkout`
     - Revert changes to particular files.
  4. `git diff`
     - Print a detailed view of your changes.
- When you are done, commit your changes locally:

```
$ git commit -a -m"Some message which Refs #1729."
```

└Step 3: Add, modify, and commit code to address the issue



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git commit
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- When you are ready to share your work with others, first make sure you are up to date:

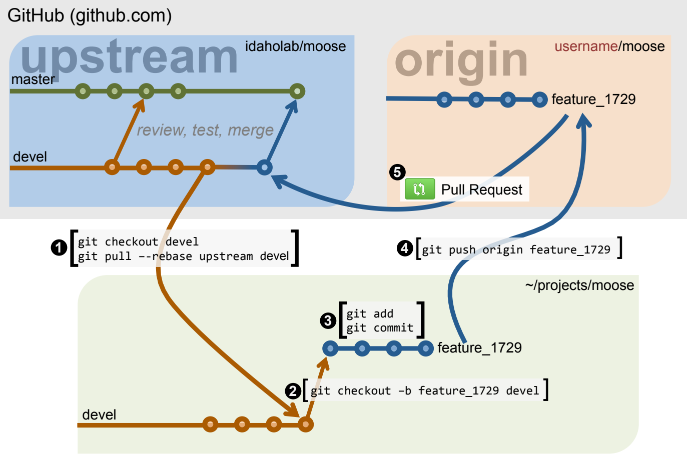
```
$ git pull --rebase upstream devel
```

- Make sure the code still compiles and the tests run.
- Then push the branch to your fork, which by default is called "origin":

```
$ git push origin feature_1729
```

- You (and others!) should now be able to see this new branch, and browse the commits directly on the GitHub site.
- You can also easily share work between different computers you own using GitHub.

Step 4: Push your work up to your fork



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git push origin feature_1729
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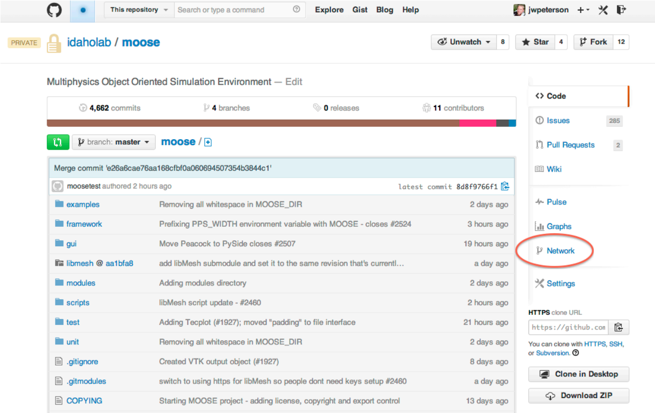
- The “network graph” shows your commits in relation to others’.



Multiphysics Object Oriented Simulation Environment — Edit

4,662 commits · 4 branches · 0 releases · 11 contributors

Merge commit 'e26a6cae76aa168cfbf0a060694507354b3844c1'

moosetest authored 2 hours ago — latest commit 8d8f9766f1

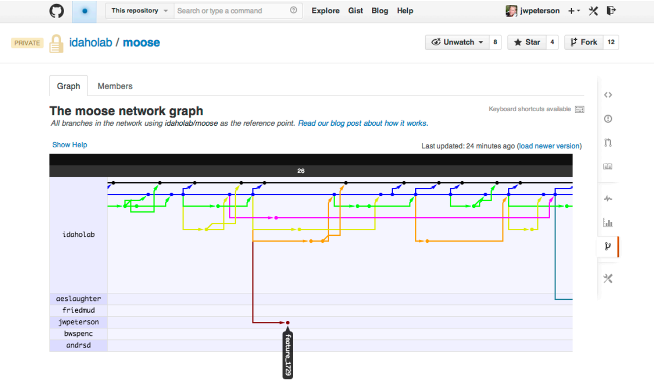
examples	Removing all whitespace in MOOSE_DIR	2 days ago
framework	Prefixing PPS_WIDTH environment variable with MOOSE - closes #2524	3 hours ago
gui	Move Peacock to PySide closes #2507	19 hours ago
libmesh @ aa1bfa8	add libMesh submodule and set it to the same revision that's currentl…	a day ago
modules	Adding modules directory	2 days ago
scripts	libMesh script update - #2460	2 hours ago
test	Adding Tecplot (#1927); moved "padding" to file interface	21 hours ago
unit	Removing all whitespace in MOOSE_DIR	2 days ago
.gitignore	Created VTK output object (#1927)	8 days ago
.gitmodules	switch to using https for libMesh so people dont need keys setup #2460	a day ago
COPYING	Starting MOOSE project - adding license, copyright and export control	13 days ago

HTTPS clone URL

https://github.com

You can clone with HTTPS, SSH, or Subversion.

- As you can see, lots of development is already happening on GitHub!

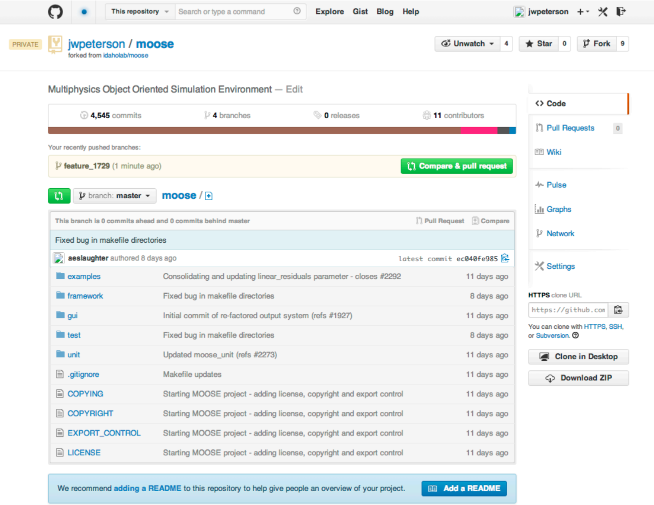


The moose network graph

All branches in the network using idaholab/moose as the reference point. Read our blog post about how it works.

Last updated: 24 minutes ago (load newer version)

- Once your branch is ready to be merged into MOOSE, you can alert other developers by creating a Pull Request in your fork.



jwpeterson / moose

forked from idaholab/moose

Multiphysics Object Oriented Simulation Environment — Edit

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Your recently pushed branches:

feature_1729 (1 minute ago)

This branch is 0 commits ahead and 0 commits behind master

Fixed bug in makefile directories

aeslaughter authored 8 days ago — latest commit ec040fe985

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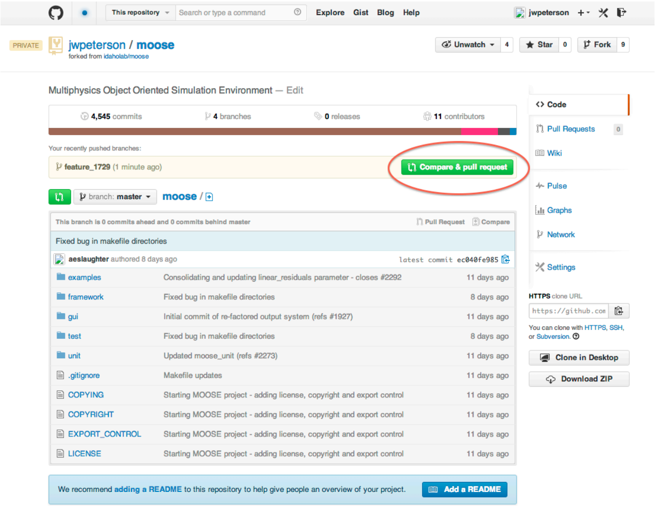
Step 5: Create a Pull Request on GitHub

- Once your branch is ready to be merged into MOOSE, you can alert other developers by creating a Pull Request in your fork.



This repository | Search or type a command | Explore | Gist | Blog | Help | jwpeterson

PRIVATE jwpeterson / moose
forked from idaholab/moose

Unwatch 4 | Star 0 | Fork 9

Multiphysics Object Oriented Simulation Environment — Edit

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Your recently pushed branches:

feature_1729 (1 minute ago) | Compare & pull request

branch: master | moose / +

This branch is 0 commits ahead and 0 commits behind master | Pull Request | Compare

Fixed bug in makefile directories

aeslaughter authored 8 days ago | latest commit ec040fe985

examples	Consolidating and updating linear_residuals parameter - closes #2292	11 days ago
framework	Fixed bug in makefile directories	8 days ago
gui	Initial commit of re-factored output system (refs #1927)	11 days ago
test	Fixed bug in makefile directories	8 days ago
unit	Updated moose_unit (refs #2273)	11 days ago
.gitignore	Makefile updates	11 days ago
COPYING	Starting MOOSE project - adding license, copyright and export control	11 days ago
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EXPORT_CONTROL	Starting MOOSE project - adding license, copyright and export control	11 days ago
LICENSE	Starting MOOSE project - adding license, copyright and export control	11 days ago

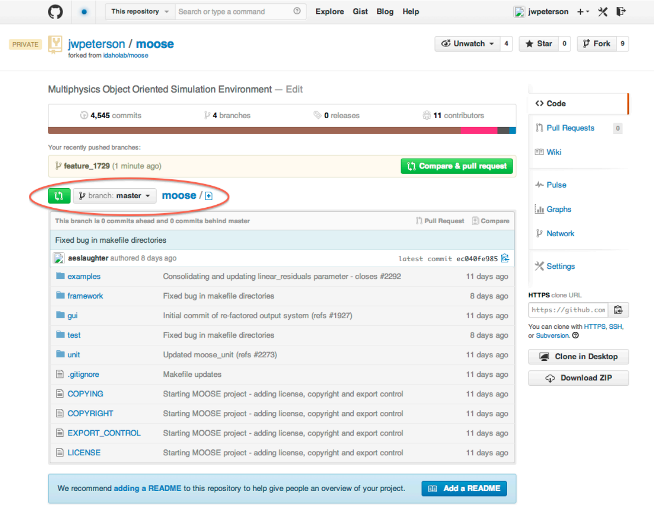
We recommend adding a README to this repository to help give people an overview of your project. | Add a README

HTTPS clone URL

https://github.com

You can clone with HTTPS, SSH, or Subversion.

- Once your branch is ready to be merged into MOOSE, you can alert other developers by creating a Pull Request in your fork.



jwpeterson / moose
forked from idaholab/moose

Multiphysics Object Oriented Simulation Environment — Edit

4,545 commits · 4 branches · 0 releases · 11 contributors

Your recently pushed branches:

feature_1729 (1 minute ago)

branch: master · moose / +

This branch is 0 commits ahead and 0 commits behind master

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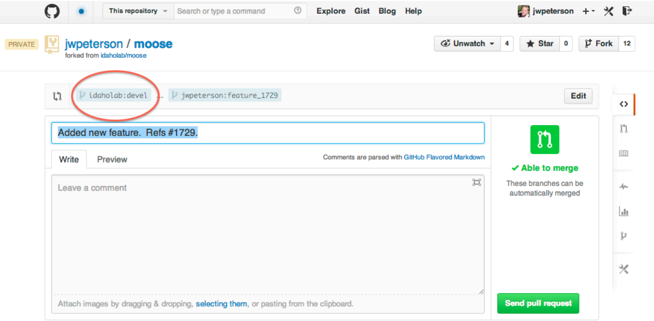
You can clone with HTTPS, SSH, or Subversion.

- Your pull request must made to idaholab:devel.



jwpeterson / moose
forked from idaholab/moose

idaholab:devel ... jwpeterson:feature_1729

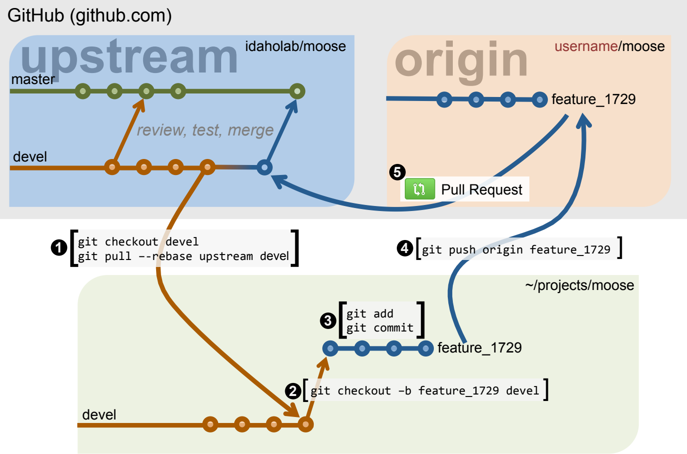
Added new feature. Refs #1729.

Comments are parsed with GitHub Flavored Markdown

Leave a comment

Attach images by dragging & dropping, selecting them, or pasting from the clipboard.

✓ Able to merge
These branches can be automatically merged



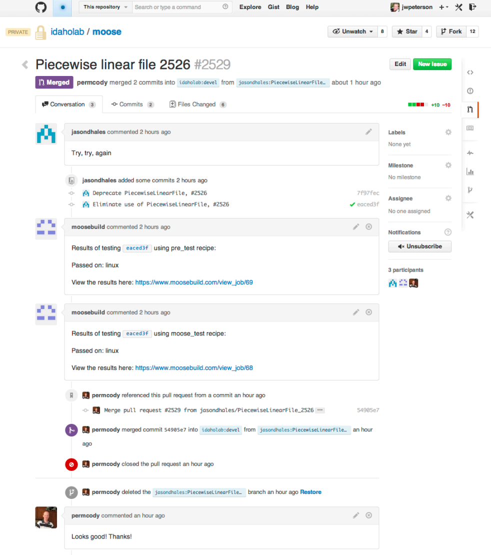
1
```
git checkout devel
git pull --rebase upstream devel
```

2
```
git checkout -b feature_1729 devel
```

3
```
git add
git commit
```

4
```
git push origin feature_1729
```

- Your pull request will be automatically updated when:
  - The continuous integration system, moosebuild, tests your new code.
  - The MOOSE developers (or others) make comments.
  - Your code is merged, or your pull request is closed for any reason.
- If you have GitHub notifications enabled, you will receive email when any of the above events occur.



Piecewise linear file 2526 #2529

Merged **permcody** merged 2 commits into `idaholab:devel` from `jasondhales:PiecewiseLinearFile…` about 1 hour ago

jasondhales commented 2 hours ago

Try, try, again

jasondhales added some commits 2 hours ago

- Deprecate PiecewiseLinearFile, #2526 — 7f97fec
- Eliminate use of PiecewiseLinearFile, #2526 — ✓ eaced3f

moosebuild commented 2 hours ago

Results of testing `eaced3f` using pre_test recipe:

Passed on: linux

View the results here: https://www.moosebuild.com/view_job/69

moosebuild commented 2 hours ago

Results of testing `eaced3f` using moose_test recipe:

Passed on: linux

View the results here: https://www.moosebuild.com/view_job/68

permcody referenced this pull request from a commit an hour ago

- Merge pull request #2529 from jasondhales/PiecewiseLinearFile_2526 … — 54905e7

permcody merged commit 54905e7 into `idaholab:devel` from `jasondhales:PiecewiseLinearFile…` an hour ago

permcody closed the pull request an hour ago

permcody deleted the `jasondhales:PiecewiseLinearFile…` branch an hour ago Restore

permcody commented an hour ago

Looks good! Thanks!

- As your pull request is discussed, you may be required to:
    - Make new commits
    - Change existing commits
    - Rebase your branch on the latest upstream/devel
- GitHub automatically updates pull requests when new commits are pushed to the PR branch.
- If you change a commit that has already been pushed to your fork, it's called “rewriting history”.

- Let's say you want to edit only the most recently pushed commit.
- First make all the necessary changes, including adding new files, and then run

```
$ git commit -a --amend
```

- You will also be able to edit the most recent commit message.
- This is a good way to add a forgotten issue number!
- Push the change up to your fork using the -f flag:

```
$ git push -f origin feature_1729
```

0. Create/decide issue to work on, say #1729.
1. Pull down the latest changes from upstream.
2. Create a branch named `feature_1729`.
3. Modify code, create new files, etc. to fix the issue.
4. Push your work up to your fork.
5. Make a pull request from your fork into idaholab:devel.
6. Monitor and respond to comments on your pull request.

1 Introduction

2 Setup

3 Workflow

4 Basic git reference

Quick Links:

- Adding a new file
- Viewing a log of commits
- Modifying a file
- Status and revert
- Viewing branches
- Deleting branches
- Setting up a .gitconfig file
- Resolving conflicts
- Gittin' fancy
- Squashing commits

- git is an enormously powerful piece of software.
- Everyone uses git slightly differently.
- There are multiple ways to accomplish every task.

Adding a new file

```
$ echo "Adding a new file!" > file.C
$ git status
# On branch feature_1729
# Untracked files:
#   (use "git add <file>..." to include in what will be committed)
#
#       file.C
nothing added to commit but untracked files present (use "git add" to track)
```

```
$ git add file.C
# On branch feature_1729
# Changes to be committed:
#   (use "git reset HEAD <file>..." to unstage)
#
#      new file:   file.C
#
```

```
$ git commit -m"Added file.C, it is great."
[feature_1729 275f0bf] Added file.C, it is great.
 1 file changed, 1 insertion(+)
 create mode 100644 file.C
```

```
$ git log
commit 275f0bfd057fc996f9cbad425f33a3543fa6d50c
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Feb 27 13:37:10 2014 -0700

    Added file.C, it is great.

commit fb36e088950ad427d95770995fdce9c64b36ee87
Author: John Peterson <jw.peterson@inl.gov>
Date:   Tue Feb 25 17:33:54 2014 -0700

    Added new feature.  Refs #1729.
```

```
$ echo "Ground-breaking work." >> file.C
$ git status
# On branch feature_1729
# Changes not staged for commit:
#   (use "git add <file>..." to update what will be committed)
#   (use "git checkout -- <file>..." to discard changes in working directory)
#
#       modified:   file.C
#
```

```
$ git commit -a -m"Now it's really great."
[feature_1729 8742bd0] Now it's really great.
 1 file changed, 1 insertion(+)
```

```
$ git log -p
commit 8742bd08e21182e0f6bd6dba5cdc8383e31f487c
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Feb 27 14:14:42 2014 -0700

    Now it's really great.

diff --git a/file.C b/file.C
index 750d815..b5fe101 100644
--- a/file.C
+++ b/file.C
@@ -1 +1,2 @@
 Adding a new file
+Ground-breaking work.
```

```
$ echo "Work in progress..." >> file.C
$ git diff
diff --git a/file.C b/file.C
index b5fe101..3edad66 100644
--- a/file.C
+++ b/file.C
@@ -1,2 +1,3 @@
 Adding a new file
 Ground-breaking work.
+Work in progress...
```

```
$ git checkout file.C
$ git status
# On branch feature_1729
nothing to commit (working directory clean)
```

```
$ git branch -a -v
  devel                       bdaff41 Merge pull request #2519 from permcody/submodule
* feature_1729                8742bd0 Now it’s really great.
  master                      ec040fe Fixed bug in makefile directories
  remotes/origin/HEAD         -> origin/master
  remotes/origin/devel        11ca9d1 Makefile updates
  remotes/origin/feature_1729 fb36e08 Added new feature.  Refs #1729.
  remotes/origin/master       ec040fe Fixed bug in makefile directories
  remotes/origin/modules      efc522e Path updates in TestHarness scripts
  remotes/upstream/devel      bdaff41 Merge pull request #2519 from permcody/submodule
  remotes/upstream/gh-pages   9821e97 add youtube videos
  remotes/upstream/master     14fe884 Merge commit ’dc8369eeefc8b937528f611db86bbbe6a5016cb5’
  remotes/upstream/modules    efc522e Path updates in TestHarness scripts
  remotes/upstream/submodule  4df4638 switch to using https for libMesh so people dont need keys
```

- You can easily delete local branches after you're done with them:

```
$ git branch -D feature_1729
error: Cannot delete the branch 'feature_1729' which you are currently on.
```

- Oops! But not branches you are currently on!

```
$ git checkout devel
$ git branch -D feature_1729
Deleted branch feature_1729 (was 079aa39).
```

- Wait, I didn't want to do that!

```
$ git checkout -b feature_1729 079aa39
$ cat ~/.gitconfig
[user]
        name = Your Name
        email = your.name@inl.gov

[color]
        ui = true

[alias]
        co = checkout
        di = diff
        st = status
        ci = commit
        br = branch
```

- You may get conflicts during rebase:

```
$ git pull --rebase upstream devel
First, rewinding head to replay your work on top of it...
Applying: Bob's changes.
Using index info to reconstruct a base tree...
M framework/src/base/MooseApp.C
Falling back to patching base and 3-way merge...
Auto-merging framework/src/base/MooseApp.C
CONFLICT (content): Merge conflict in framework/src/base/MooseApp.C
Failed to merge in the changes.
Patch failed at 0001 Bob's changes.
The copy of the patch that failed is found in:
   /Users/petejw/projects/moose_git/.git/rebase-apply/patch

When you have resolved this problem, run "git rebase --continue".
If you prefer to skip this patch, run "git rebase --skip" instead.
To check out the original branch and stop rebasing, run "git rebase --abort".
```

- Run git status to get some idea of what happened.

```
$ git status
# HEAD detached at 7910988
# You are currently rebasing branch 'feature_1729' on '7910988'.
#   (fix conflicts and then run "git rebase --continue")
#   (use "git rebase --skip" to skip this patch)
#   (use "git rebase --abort" to check out the original branch)
#
# Unmerged paths:
#   (use "git reset HEAD <file>..." to unstage)
#   (use "git add <file>..." to mark resolution)
#
#       both modified:      src/base/MooseApp.C
#
no changes added to commit (use "git add" and/or "git commit -a")
```

- Conflicts are displayed in the “usual” format:

```
  // I implemented feature #1729 here!
<<<<<<< HEAD
  // Alice added this.
=======
  // Bob added this.
>>>>>>> Bob's changes.
```

- Once you have resolved the conflict, `git add` the file and continue.

```
$ git add src/base/MooseApp.C
$ git rebase --continue
Applying: Bob's changes.
```

- You can always give up and start over by typing:

```
$ git rebase --abort
$ git log --stat
commit 79a911be66a03624148bfe7591ca341d5675f673
Author: Andrew E Slaughter <andrew.slaughter@inl.gov>
Date:   Tue Feb 25 07:45:07 2014 -0700

    Cleaned up whitespace (#1927)

 .../tests/outputs/checkpoint/checkpoint_interval.i |    2 +-
 test/tests/outputs/common/exodus.i                 |    2 +-
 test/tests/outputs/console/console_transient.i     |    2 +-
 test/tests/outputs/csv/csv_transient.i             |    2 +-
 test/tests/outputs/error/duplicate_output_files.i  |    2 +-
 test/tests/outputs/error/duplicate_outputs.i       |    2 +-
 test/tests/outputs/exodus/exodus.i                 |    2 +-
 test/tests/outputs/exodus/exodus_oversample.i      |    2 +-
 test/tests/outputs/vtk/vtk_diff.i                  |    4 ++--
 test/tests/outputs/vtk/vtk_parallel.i              |    4 ++--
 test/tests/outputs/vtk/vtk_serial.i                |    4 ++--
 11 files changed, 14 insertions(+), 14 deletions(-)
```

```
$ git log --graph --date-order --oneline --all --decorate
* 8742bd0 (HEAD, feature_1729) Now it's really great.
* 275f0bf Added file.C, it is great.
| *   bdaff41 (upstream/devel, devel) Merge pull request #2519 from permcody/submodule
| |\
| | | *   14fe884 (upstream/master) Merge commit 'dc8369eeefc8b937528f611db86bbbe6a5016cb5'
| | | |\
| | |_|/
| |/| |
| * | | dc8369e Need initial condition for xda tests (#1927)
| * | |   7e9385c Merge pull request #2509 from aeslaughter/sync-1927
| |\ \ \
| | | * | acfa117 switch to using https for libMesh so people dont need keys setup #2460
| | | * | 07cd6d9 add libMesh submodule and set it to the same revision that's currently in trunk #2460
| | |/ /
| |/| |
| | | *   f8459ed Merge commit 'a9cf3f4480364376623bf3647d49dfa7a7be8522'
| | | |\
| * | | \   fb0fc3c Merge pull request #2515 from aeslaughter/xda-1927
| |\ \ \ \
| | | |_|/
| | |/| |
| | * | | a9cf3f4 Created separate XDA and XDR objects (#1927)
| | * | | 9e48564 Created XDA outputter (#1927)
| |/ / /
| | * | 1a6e5f8 Improved OutputBase interface by seperating interval check from the user-facing objects
| |/ /
* | | fb36e08 (origin/feature_1729) Added new feature.  Refs #1729.
|/ /
| *   ae83390 Merge commit '5c2cc71500d503da9fc17a53bc68ccf382c0f993'
```

- Suppose you want to combine the three most recent commits:

```
$ git log
commit e70385991c1c2c93055d0e0aa64e0904740d54d5
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Jun 5 10:35:32 2014 -0600

    Added third line.

commit 9fb14f223da8058181d0bdefc8968b3996e45321
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Jun 5 10:33:02 2014 -0600

    Added second line.

commit 693277abdd78bd6ee4111005a7eff9a5b532b6c4
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Jun 5 10:32:15 2014 -0600

    Added first line.
```

- Use the “interactive” rebase capability of git:

```
$ git rebase -i HEAD~3
```

- Which brings up the git editor:

```
pick 693277a Added first line.
pick 9fb14f2 Added second line.
pick e703859 Added third line.

# Rebase 76891ca..e703859 onto 76891ca
#
# Commands:
#  p, pick = use commit
#  r, reword = use commit, but edit the commit message
#  e, edit = use commit, but stop for amending
#  s, squash = use commit, but meld into previous commit
#  f, fixup = like "squash", but discard this commit's log message
#  x, exec = run command (the rest of the line) using shell
#
# These lines can be re-ordered; they are executed from top to bottom.
#
# If you remove a line here THAT COMMIT WILL BE LOST.
#
# However, if you remove everything, the rebase will be aborted.
#
# Note that empty commits are commented out
```

- Replace “pick” with “s” (for squash) on the second and third commits:

```
pick 693277a Added first line.
s 9fb14f2 Added second line.
s e703859 Added third line.
```

- This will “squash” the second and third commits into the first.

- Merge your commit messages into a single message. . .

```
# This is a combination of 3 commits.
# The first commit's message is:
Added first line.

# This is the 2nd commit message:

Added second line.

# This is the 3rd commit message:

Added third line.

# Please enter the commit message for your changes. Lines starting
# with '#' will be ignored, and an empty message aborts the commit.
# rebase in progress; onto 76891ca
# You are currently editing a commit while rebasing branch 'squash'
# on '76891ca'.
#
# Changes to be committed:
#       new file:   file.txt
```

- After merging the commit messages, save and exit the editor.

```
[detached HEAD cc01822] Added all the lines.
 1 file changed, 3 insertions(+)
 create mode 100644 file.txt
Successfully rebased and updated refs/heads/squash.
```

- Git log now shows a single commit containing all the changes.

```
$ git log -p
commit cc0182214428783efc5411e5c0690c047bb2bedc
Author: John Peterson <jw.peterson@inl.gov>
Date:   Thu Jun 5 10:32:15 2014 -0600

    Added all the lines.

diff --git a/file.txt b/file.txt
new file mode 100644
index 0000000..20eb539
--- /dev/null
+++ b/file.txt
@@ -0,0 +1,3 @@
+Added first line.
+Added second line.
+Added third line.
```

- If you squash commits which have already been pushed to a remote repository:
  - You are rewriting history.
  - You will have to use "push -f" to overwrite existing commits with new ones.
- Within the MOOSE project, squashing and amending commits on feature branches prior to integration with the devel branch is preferred.
- History is never rewritten on the MOOSE devel or master branches.