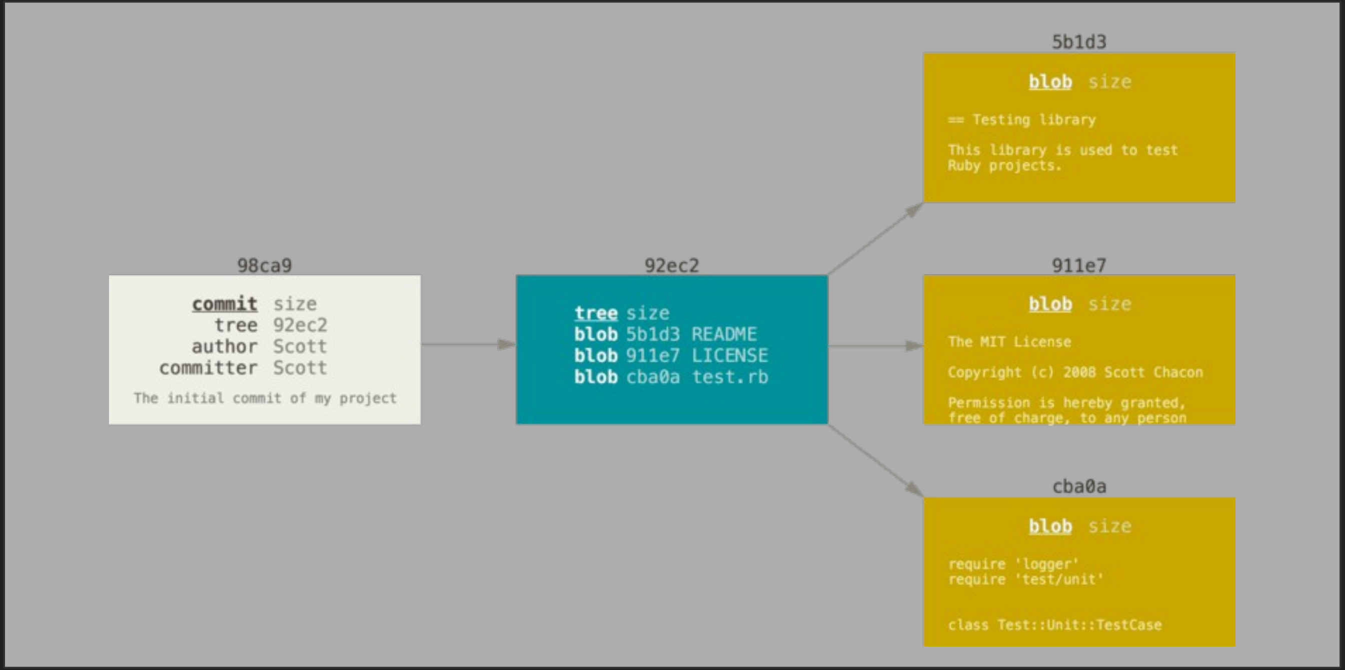
Branch, Merge and Pull Request

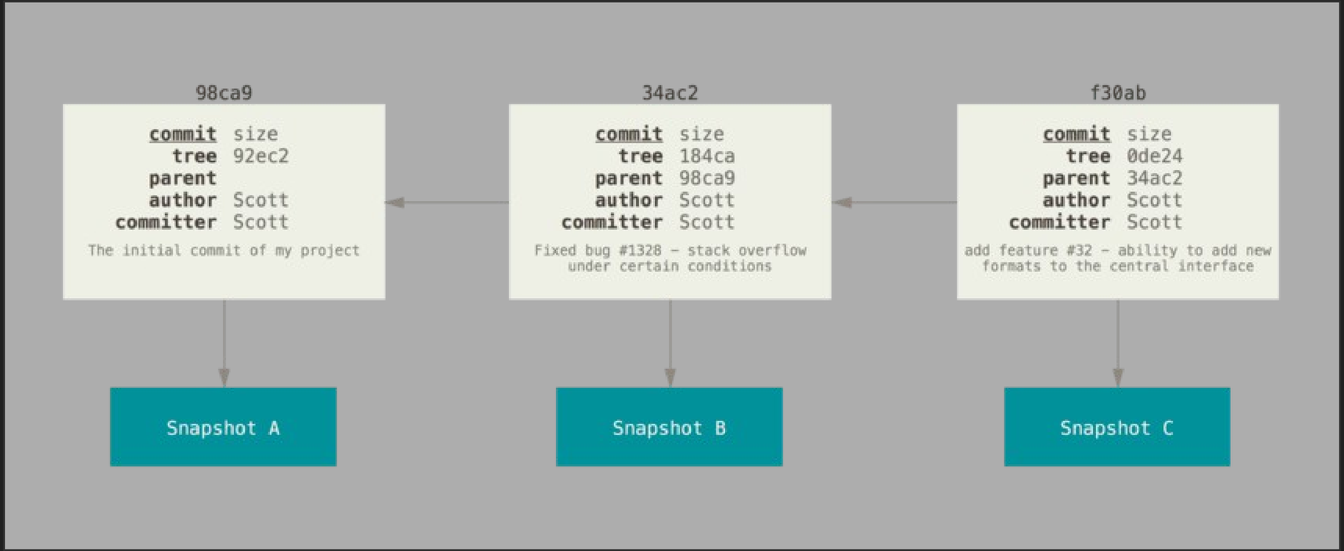
Git killer features...

Git Branch

How Git Stores its Data

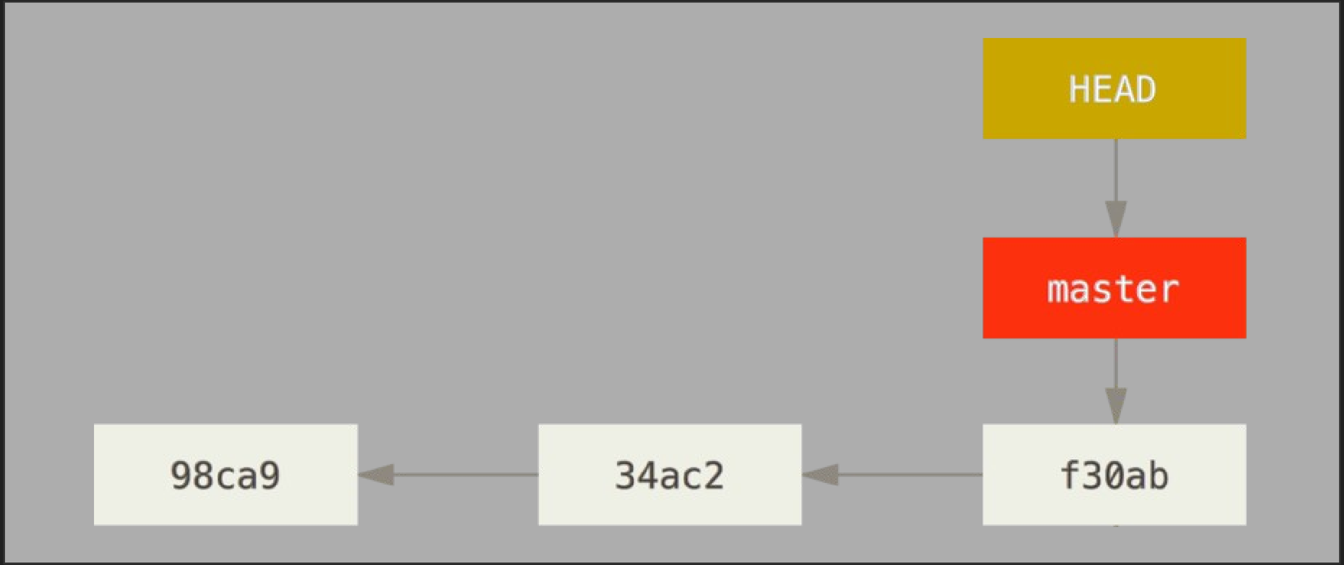


Git Commit Command



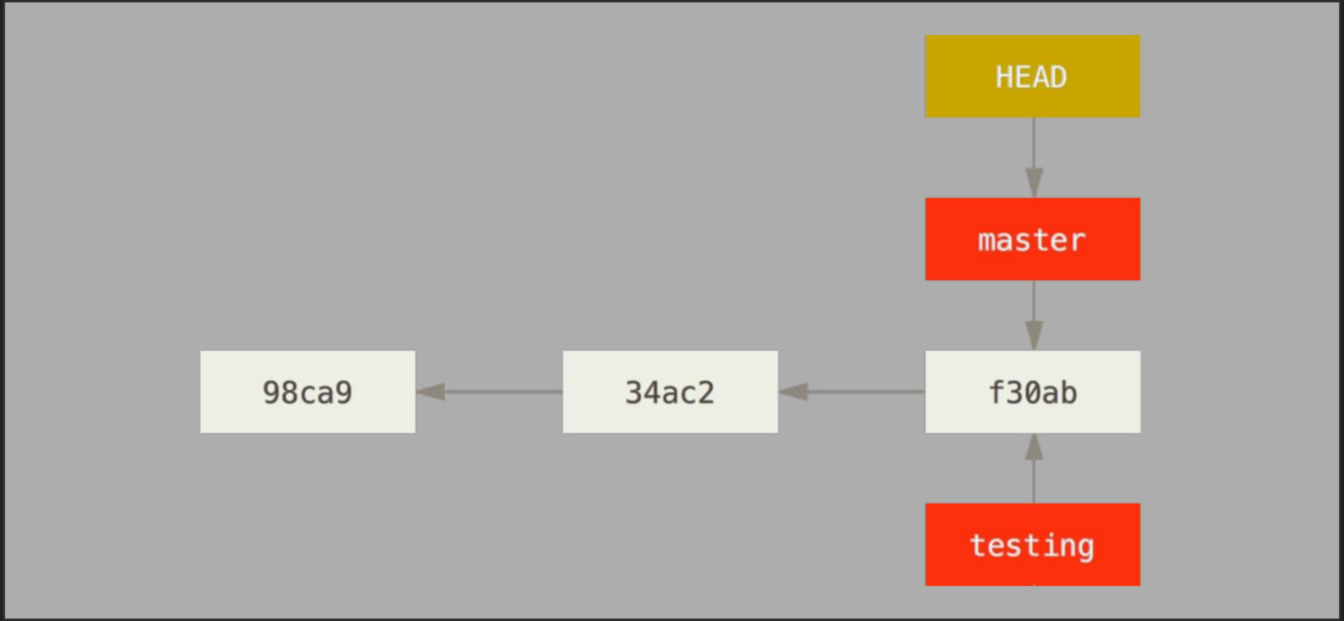
```
git commit -m 'The initial commit of my project'
git commit -m 'Fixed bug #1328 - stack overflow under certain conditions'
git commit -m 'add feature #32 - ability to add new formats to the central interface'
```

Head



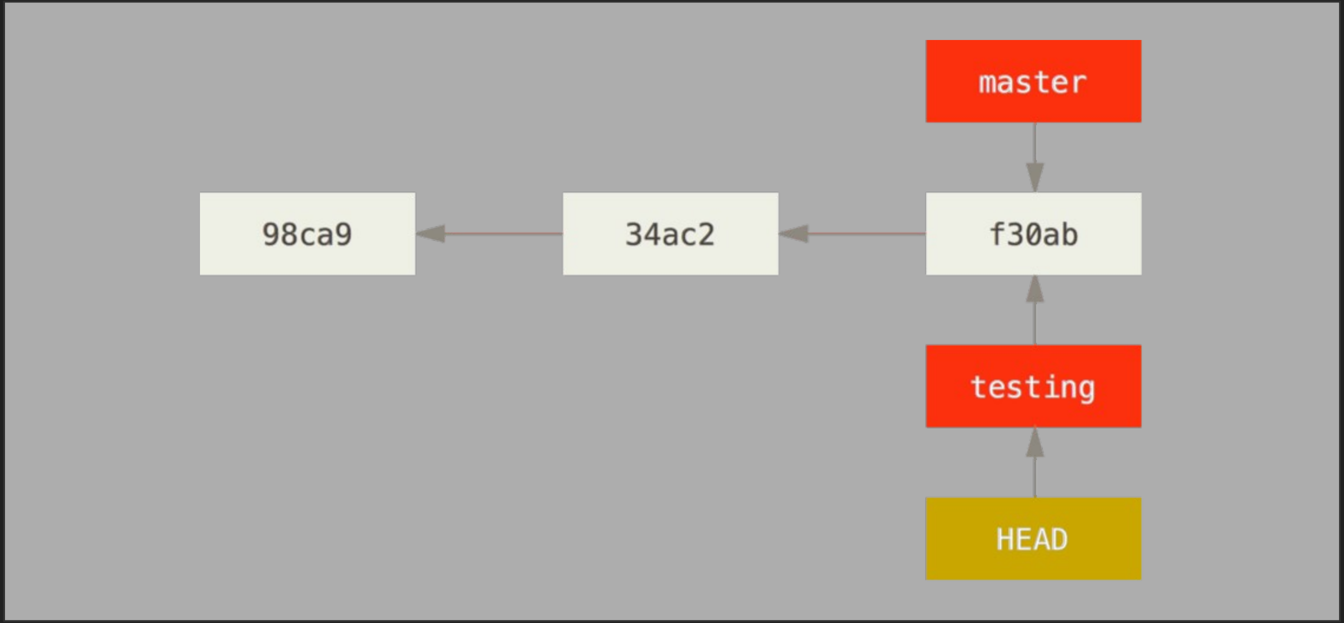
Head is a pointer to which branch you are right now

Git Branch Command



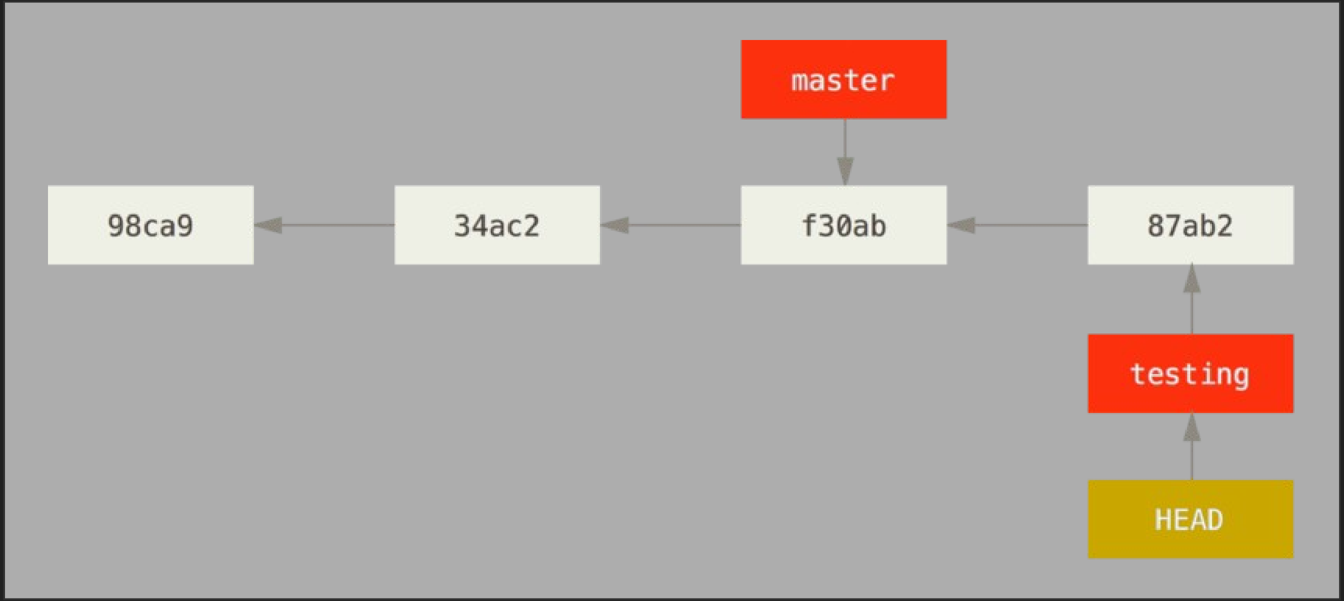
```
git branch testing
```

Git Checkout Command



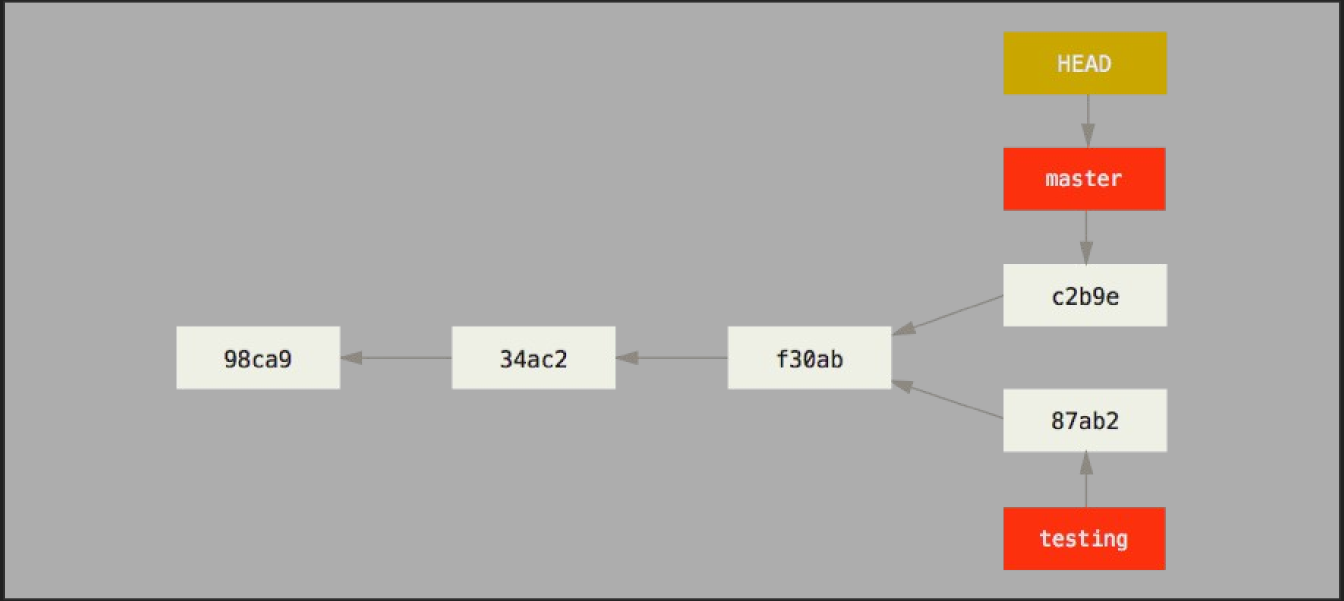
```
git checkout testing
```

Committing to a Branch



After you commit to testing branch, testing will move forward but master will stay behind. What happened to the files when you switch back the HEAD to master?

Divergent History



After you commit to master, your Git repository will have a divergent history like above.

Git Log Command

```
$ git log --oneline --decorate --graph --all
* c2b9e (HEAD, master) Made other changes
| * 87ab2 (testing) Made a change
|/
* f30ab Add feature #32 - ability to add new formats to the central interface
* 34ac2 Fix bug #1328 - stack overflow under certain conditions
* 98ca9 initial commit of my project
```

Git Merge

Scenario 1

1. You have a perfectly working source code,
2. You want to add a new feature but do not want to alter directly the perfectly working source code in fear of breaking it,
3. You will create a branch of the perfectly working source code, then you will add the feature in the branch,
4. After you test the newly created feature and 100% sure that it is working, you want to put the changes you made into the perfectly working source code, by merging it to the branch.

Scenario 1.1

```
$ mkdir git_branch_demo
$ cd git_branch_demo/
$ git init
$ touch hello.js
$ code hello.js
$ git add .
$ git commit -m 'first commit'
$ code hello.js
$ git add .
$ git commit -m 'add hello variable'
$ code hello.js
$ git add .
$ git commit -m 'add function printHello'
```

```
console.log('hello');
```

```
var hello = 'hello';

console.log(hello);
```

```
var hello = 'hello';

function printHello(sIn) {
  console.log(sIn);
}
```

Scenario 1.2 and 1.3

```
$ git branch f001
$ git log --oneline --decorate --graph --all
$ git checkout f001
$ code hello.js
$ git add .
$ git commit -m 'add times feature'
$ git log --oneline --decorate --graph --all
$ code hello.js
$ git add .
$ git commit -m 'add line number feature'
$ git log --oneline --decorate --graph --all
```

```
var hello = 'hello';

function printHello(sIn, nTimes) {
  for (var i = 0; i < nTimes; i++) {
      console.log(sIn);
  }
}

printHello(hello, 10);
```

```
var hello = 'hello';

function printHello(sIn, nTimes, bLine) {
  for (var i = 1; i <= nTimes; i++) {
      console.log(`${bLine ? i + ':' : {}} ${sIn}`);
  }
}

printHello(hello, 10, true);
```

Scenario 1.4

```
$ git checkout master
$ git merge f001
$ git log --oneline --decorate --graph --all
$ git branch --delete f001
$ git log --oneline --decorate --graph --all
```

```
* e344cd4 (HEAD -> master, f001) add line number feature
* f7f0410 add times feature
* 68e8a96 add function printHello
* 3d27607 add hello variable
* 523cef2 first commit
```

```
* e344cd4 (HEAD -> master) add line number feature
* f7f0410 add times feature
* 68e8a96 add function printHello
* 3d27607 add hello variable
* 523cef2 first commit
```

Scenario 2

1. You have a working source code,
2. You want to add a new feature but do not want to alter directly the working source code in fear of breaking it,
3. You will create a branch of the working source code,
4. Suddenly a customer found a problem in your working source code, then you decided to make a hotfix for it,
5. After the hotfix has been made, you continue your work on the feature,
6. After you test the newly created feature and 100% sure that it is working, you want to put the changes you made into the working source code (hotfix has been applied), by merging it to the branch.

Scenario 2.1

```
$ mkdir git_merge_demo
$ cd git_merge_demo/
$ git init
$ touch hello.js
$ code hello.js
$ git add .
$ git commit -m 'first commit'
```

```
var hello = 'hello';

function printHello(sIn, nTimes) {
  for (var i = 0; i <= nTimes; i++) {
    console.log(sIn);
  }
}

printHello(hello, 10);
```

Scenario 2.2 and 2.3

```
$ git branch f001
$ git checkout f001
$ code hello.js
$ git add .
$ git commit -m 'add line number feature'
$ git log --oneline --decorate --graph --all
```

```
var hello = 'hello';

function printHello(sIn, nTimes, bLine) {
  for (var i = 0; i <= nTimes; i++) {
    console.log(`${bLine ? i + ':' : {}} ${sIn}`);
  }
}

printHello(hello, 10, true);
```

Scenario 2.4

```
$ git checkout master
$ code hello.js
$ git add .
$ git commit -m 'hotfix loop limit'
$ git log --oneline --decorate --graph --all
```

```
var hello = 'hello';

function printHello(sIn, nTimes) {
  for (var i = 0; i < nTimes; i++) {
    console.log(sIn);
  }
}

printHello(hello, 10);
```

Scenario 2.5

```
$ git checkout f001
$ code hello.js
$ git add .
$ git commit -m 'add line prefix'
$ git log --oneline --decorate --graph --all
```

```
var hello = 'hello';

function printHello(sIn, nTimes, bLine) {
  for (var i = 0; i <= nTimes; i++) {
    console.log(`${bLine ? 'line ' + i + ':' : {}} ${sIn}`);
  }
}

printHello(hello, 10, true);
```

Scenario 2.6

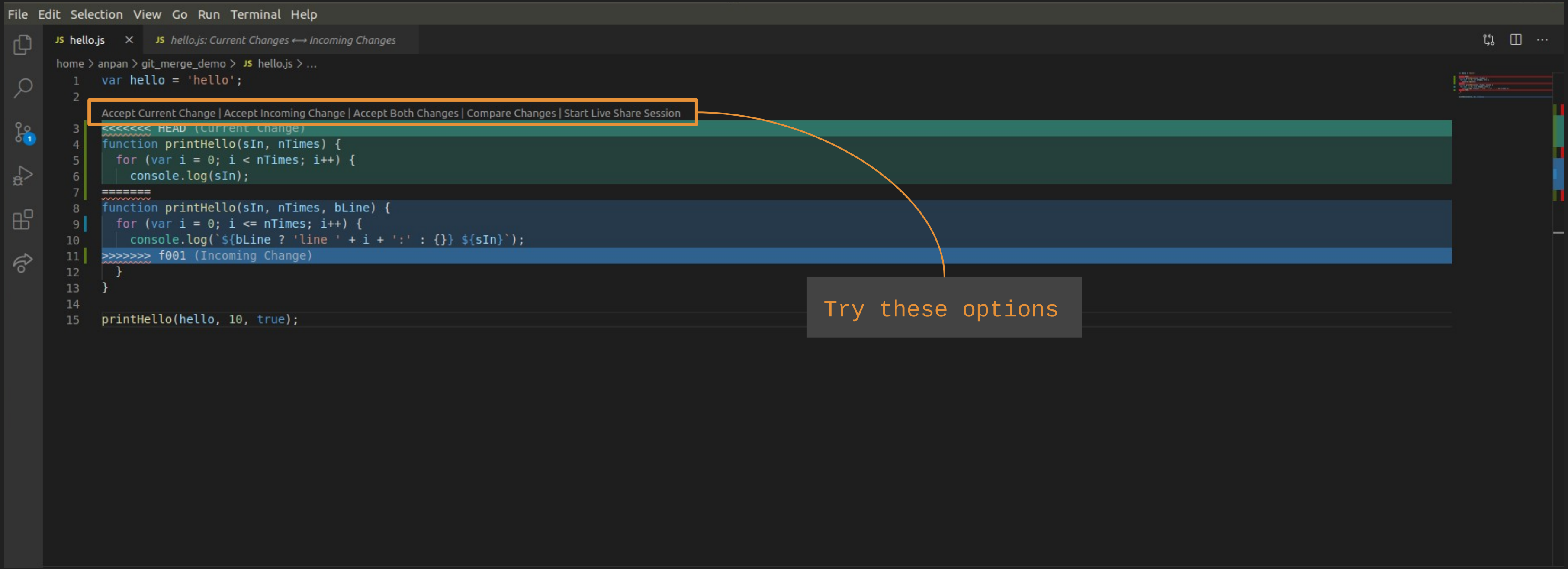
```
$ git checkout master
$ git merge f001
$ code hello.js
$ git add .
$ git commit -m 'merge and fix conflicts'
$ git log --oneline --decorate --graph --all
```

```
Auto-merging hello.js
CONFLICT (content): Merge conflict in hello.js
Automatic merge failed; fix conflicts and then commit the result.
```

See next slide

```
*   675840d (HEAD -> master) merge and fix conflicts
|\
| * 74050f7 (f001) add line prefix
| * 6973481 add line number feature
* | 3db24c1 hotfix loop limit
|/
* 82ed675 first commit
```

Editing Conflicts in VS Code


File Edit Selection View Go Run Terminal Help
hello.js
hello.js: Current Changes ⟷ Incoming Changes
home > anpan > git_merge_demo > hello.js > ...
Accept Current Change | Accept Incoming Change | Accept Both Changes | Compare Changes | Start Live Share Session
Try these options

```
var hello = 'hello';

<<<<<<< HEAD (Current Change)
function printHello(sIn, nTimes) {
  for (var i = 0; i < nTimes; i++) {
    console.log(sIn);
=======
function printHello(sIn, nTimes, bLine) {
  for (var i = 0; i <= nTimes; i++) {
    console.log(`${bLine ? 'line ' + i + ':' : {}} ${sIn}`);
>>>>>>> f001 (Incoming Change)
  }
}

printHello(hello, 10, true);
```

GitHub Pull Request

Scenario 3

1. You want to contribute to a GitHub repository,
2. Make a clone out of the GitHub repository,
3. Make a branch from the cloned GitHub repository,
4. Make the needed changes on the branch,
5. Push the branch to GitHub repository,
6. Create a pull request.

Scenario 3.1 until 3.5

```
$ mkdir git_pull_request_demo
$ cd git_pull_request_demo/
$ git clone git@github.com:phase-0-branch-exercises/melee-ranged-grouping.git
$ cd melee-ranged-grouping/
$ git checkout -b answer
$ touch answer.js
$ code answer.js
$ git add .
$ git commit -m 'commit answer'
$ git push -u origin answer
```

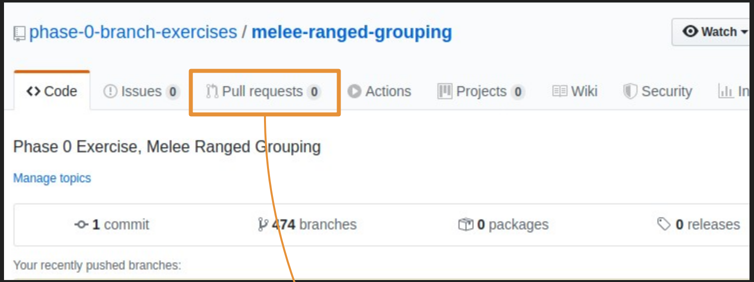
same as

```
$ git branch answer
$ git checkout answer
```

```
console.log('hello');
```

```
remote: Create a pull request for 'answer' on GitHub by visiting:
remote:      https://github.com/phase-0-branch-exercises/melee-ranged-grouping/pull/new/answer
```

Scenario 3.6.1



phase-0-branch-exercises / melee-ranged-grouping

Watch

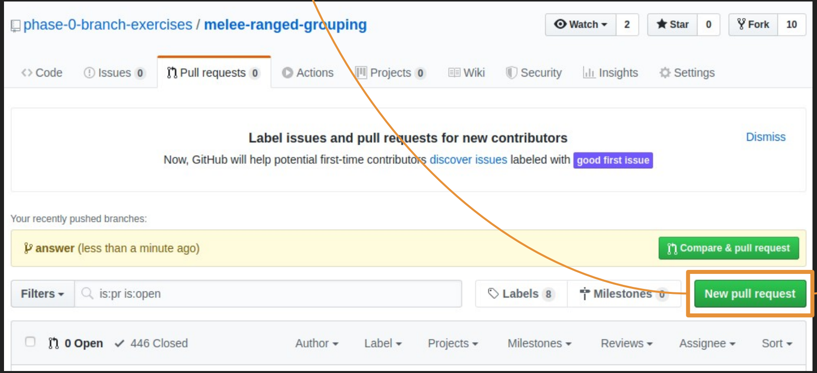
Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | In

Phase 0 Exercise, Melee Ranged Grouping

Manage topics

1 commit | 474 branches | 0 packages | 0 releases

Your recently pushed branches:



phase-0-branch-exercises / melee-ranged-grouping

Watch 2 | Star 0 | Fork 10

Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights | Settings

Label issues and pull requests for new contributors

Now, GitHub will help potential first-time contributors discover issues labeled with good first issue

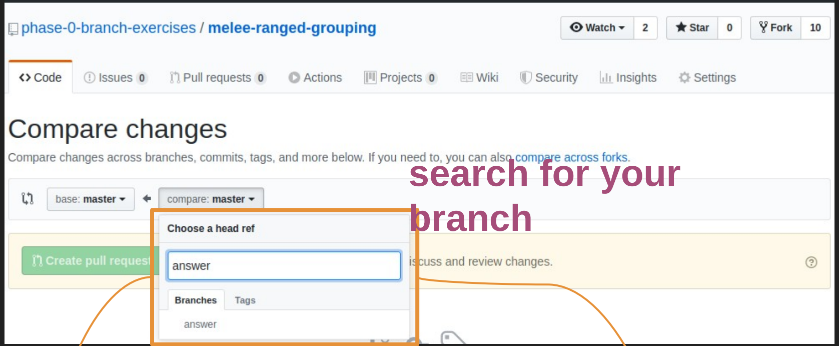
Dismiss

Your recently pushed branches:

answer (less than a minute ago) — Compare & pull request

Filters | is:pr is:open | Labels 8 | Milestones 0 | New pull request

0 Open ✓ 446 Closed | Author | Label | Projects | Milestones | Reviews | Assignee | Sort



phase-0-branch-exercises / melee-ranged-grouping

Watch 2 | Star 0 | Fork 10

Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights | Settings

Compare changes

Compare changes across branches, commits, tags, and more below. If you need to, you can also compare across forks.

base: master ← compare: master

Create pull request … iscuss and review changes.

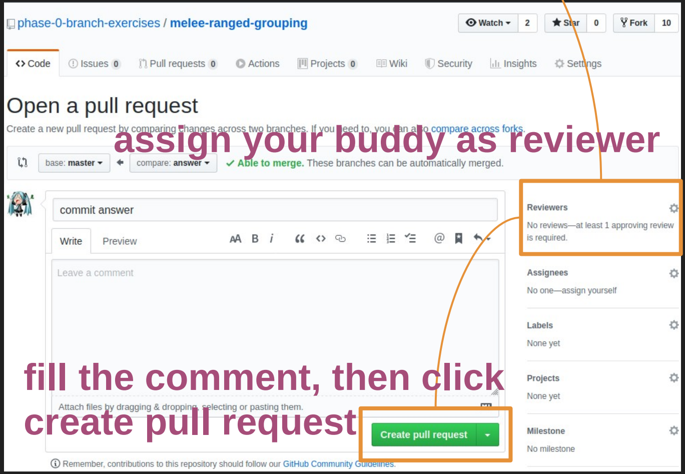
Choose a head ref

answer

Branches | Tags

answer

search for your branch



phase-0-branch-exercises / melee-ranged-grouping

Watch 2 | Star 0 | Fork 10

Code | Issues 0 | Pull requests 0 | Actions | Projects 0 | Wiki | Security | Insights | Settings

Open a pull request

Create a new pull request by comparing changes across two branches. If you need to, you can also compare across forks.

base: master ← compare: answer ✓ Able to merge. These branches can be automatically merged.

commit answer

Write | Preview

Leave a comment

Attach files by dragging & dropping, selecting or pasting them.

Create pull request

Remember, contributions to this repository should follow our GitHub Community Guidelines.

Reviewers: No reviews—at least 1 approving review is required.

Assignees: No one—assign yourself

Labels: None yet

Projects: None yet

Milestone: No milestone

assign your buddy as reviewer

fill the comment, then click create pull request

Scenario 3.6.2

Or simply just click the link in terminal

```
remote: Create a pull request for 'answer' on GitHub by visiting:
remote:      https://github.com/phase-0-branch-exercises/melee-ranged-grouping/pull/new/answer
```

CLICK THIS!