git pratcical cases

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Clean Git History

Several working trees

Regression tracking

Branch management pro tips

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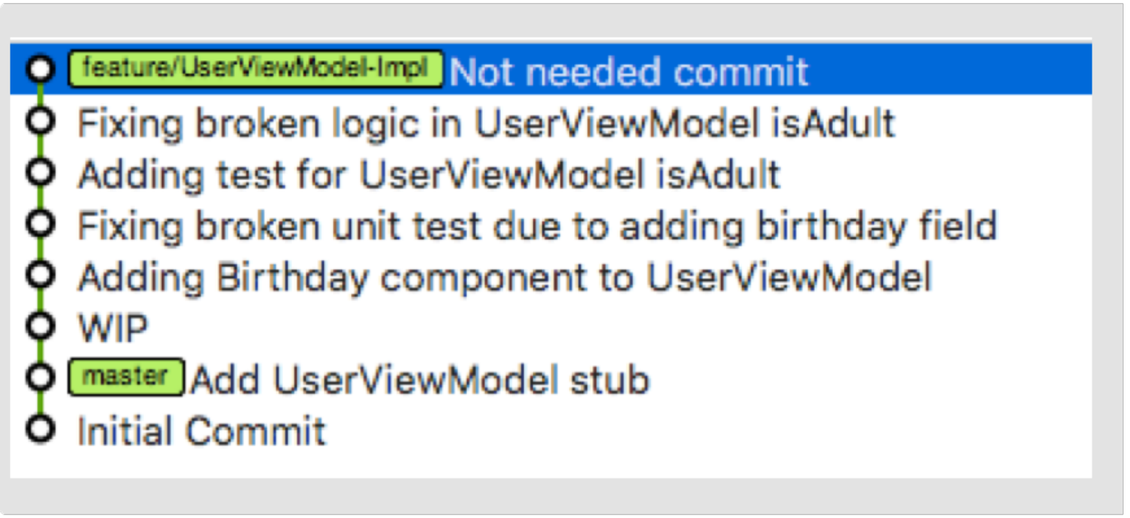
Branch management pro tips

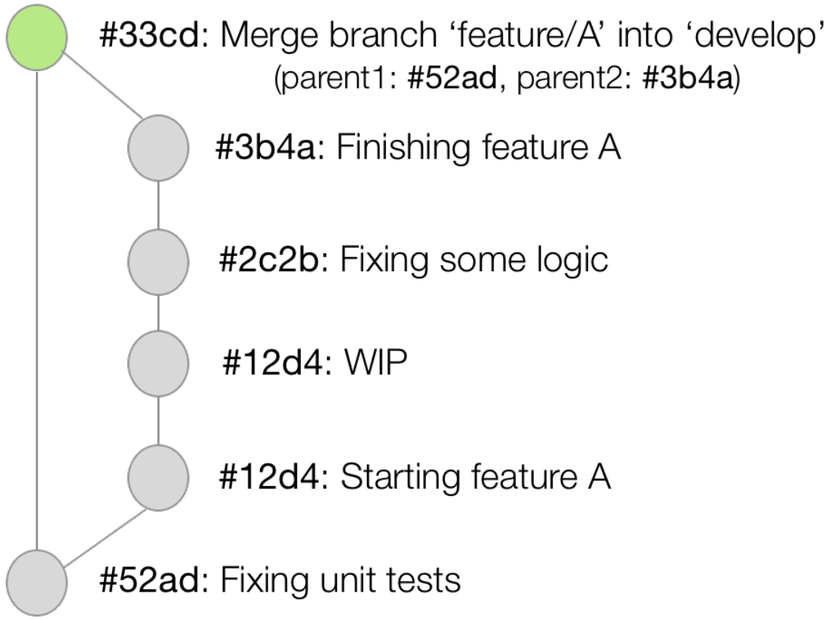
Typical work flow

1. Create a branch from develop
2. Work
3. Merge back to develop



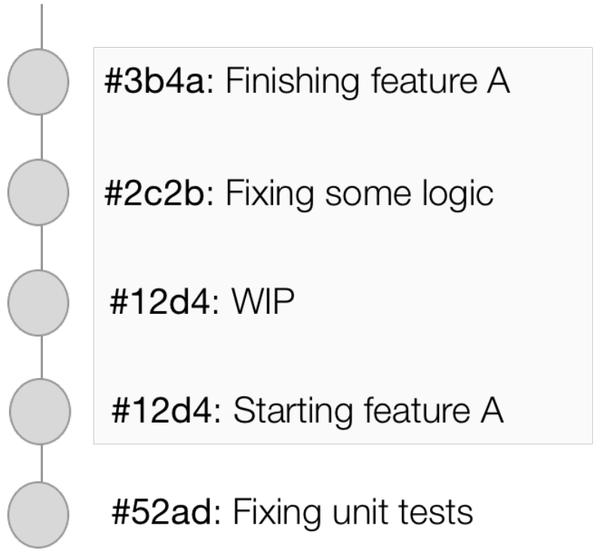
git merge

--no-ff (Default for GitHub, Bitbucket, Gitlab)



develop

fast forward (git default)



develop

¿ Fast forward or not ?

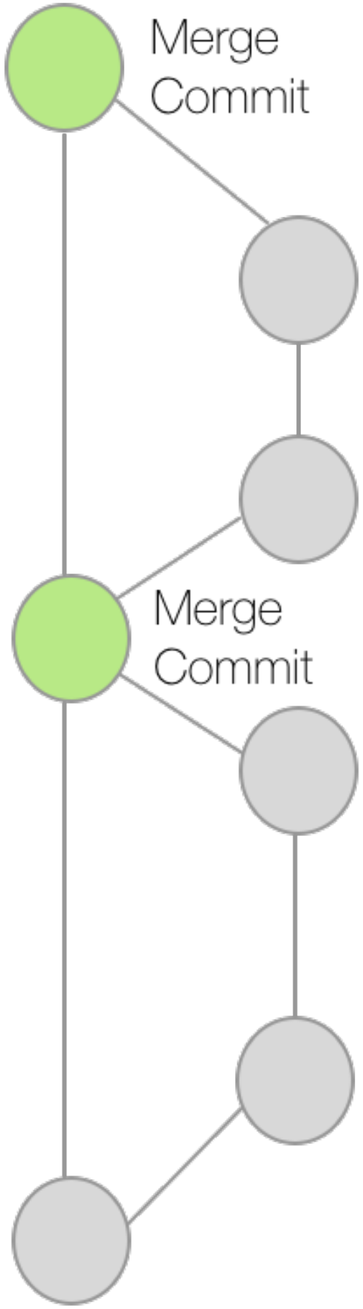
- Merge with fast forward is hard to revert
  - No single commit to revert
  - History is linear

but wait...

linear history is easier to search
(bisect, blame, log)

Option 3

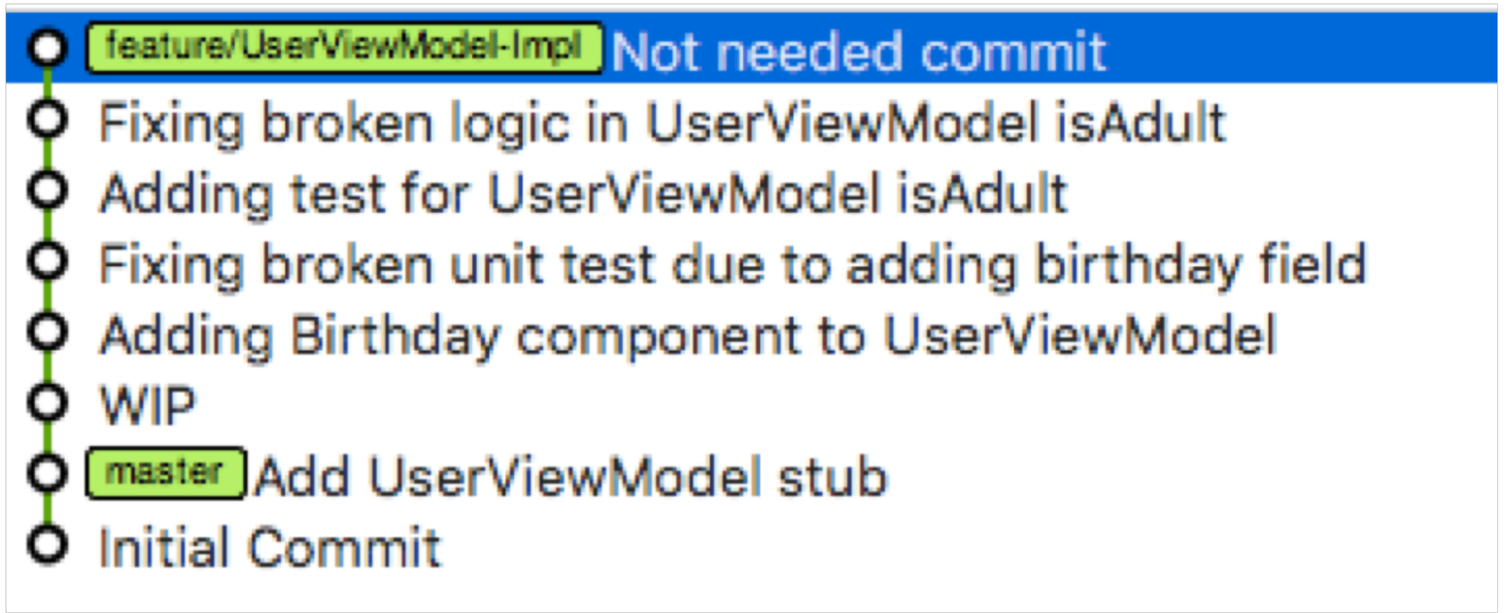
1. rebase
2. create PR after rebase
3. merge with --no-ff



Option 3

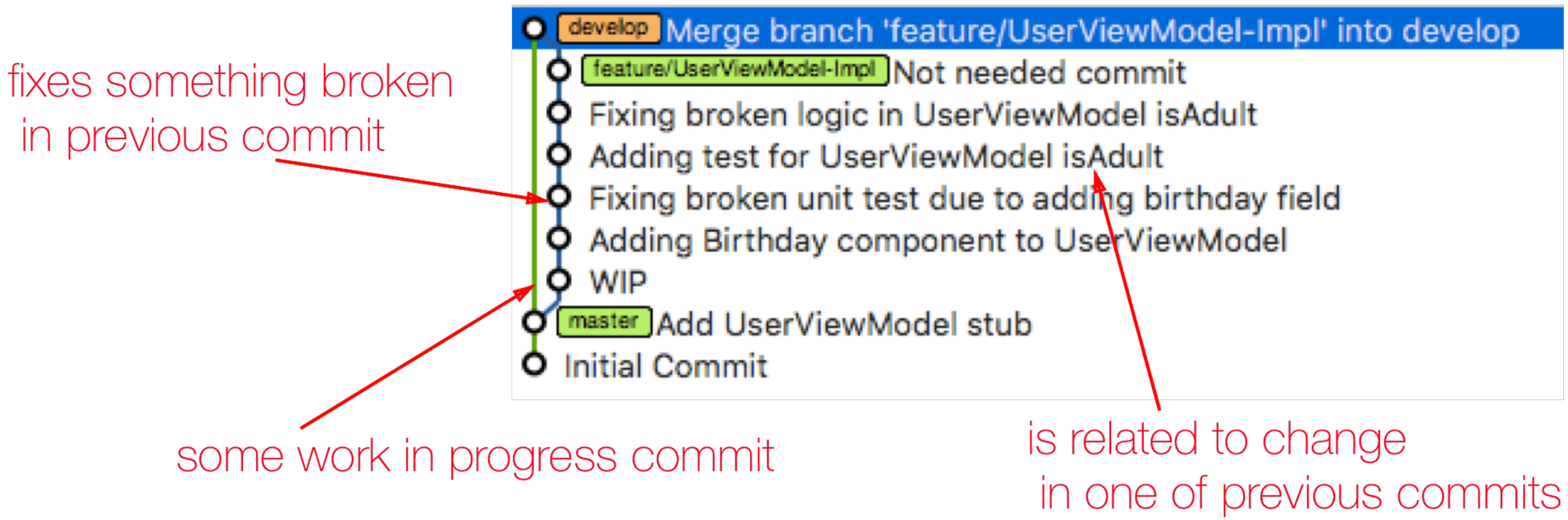
- Conflicts are harder to resolve when rebasing
- Commit hash is re-generated
- Extra step

Let's go back to our example



What are the pitfalls ?

- Feature branches often have snapshot (WIP) commits



Why snapshot commits are bad?

- Usually break the build
- Frequently do not pass unit tests
- Create line noise: One commit fixes another in the same feature branch

Why do we make them?

- Adhoc commits are faster and easier to make
- We need checkpoints in our code
- Before intermediate code reviews

They get merged into develop

Breaking git bisect, leaving develop in messy state

What are the options

Regular History

VS

Clean History

Let's be clean...

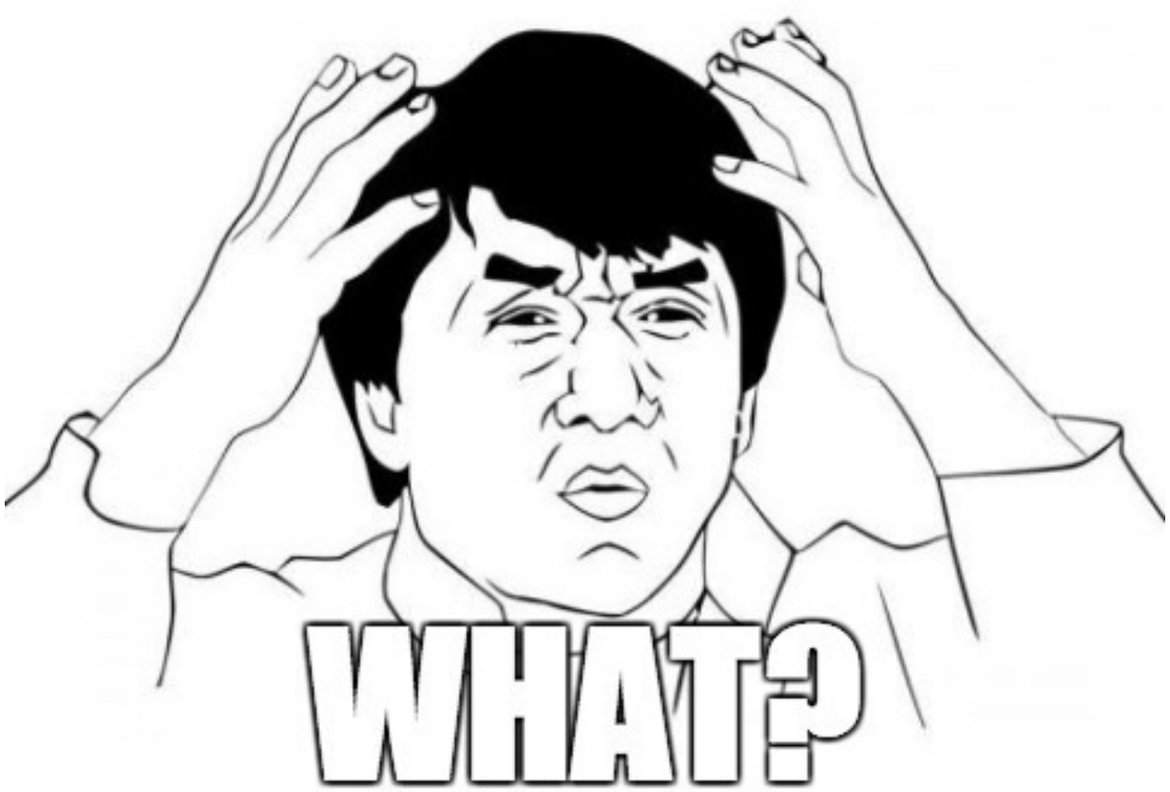
Clean history (branch types)

Public

- Immutable
- Every commit well documented
- Includes: master, develop, release*, hotfix*
- No cherrypicking between public branches

Private

- Scratchpads
- Local, no forks possible
- History rewrite is plausible
- Can cherrypick from private branches



history rewrite?

*if you work on a private branch

History rewrite tips

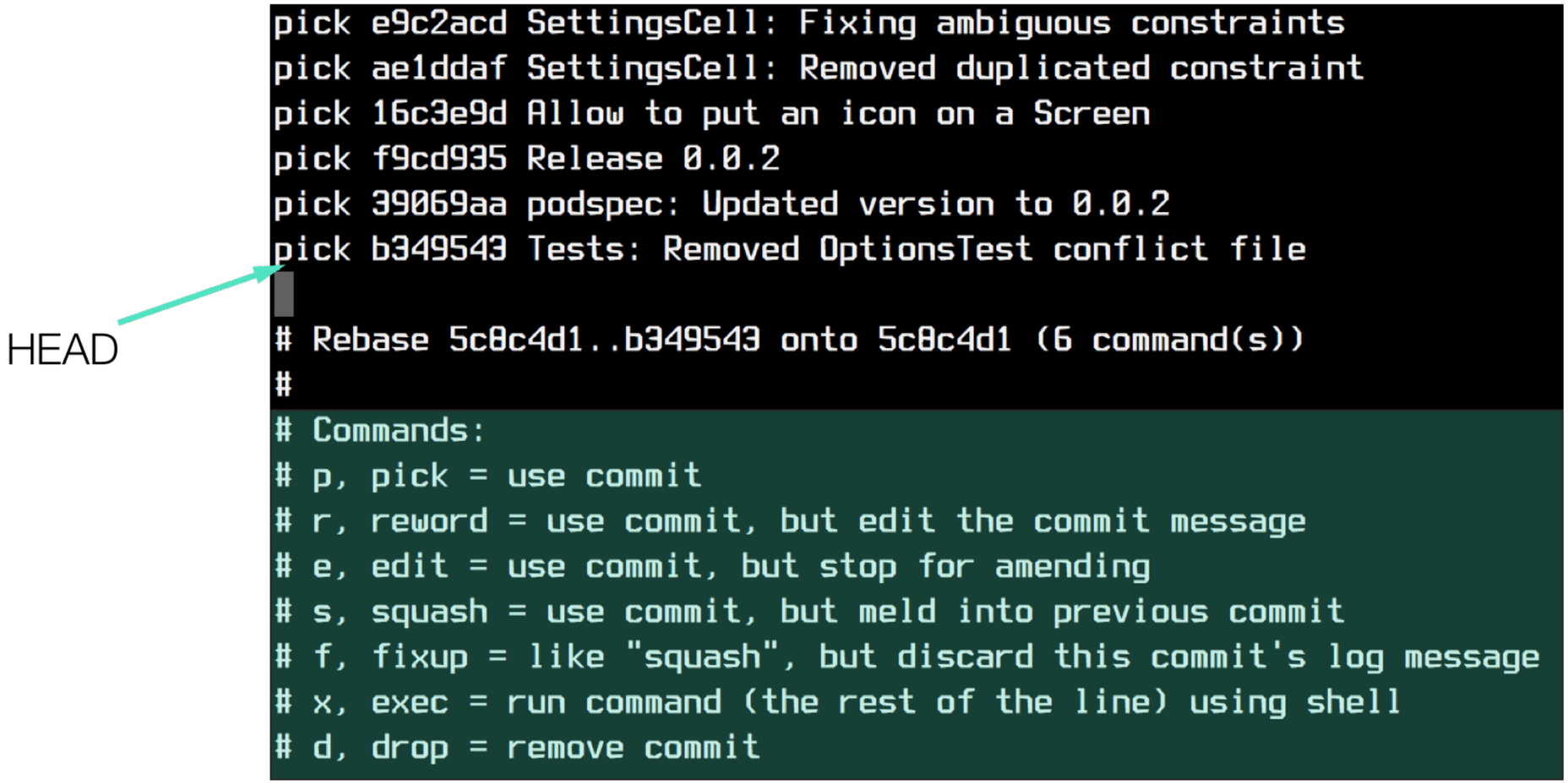
Rewriting history

It's all about git rebase:

```
git rebase -i HEAD~N
git rebase -i SHA
```

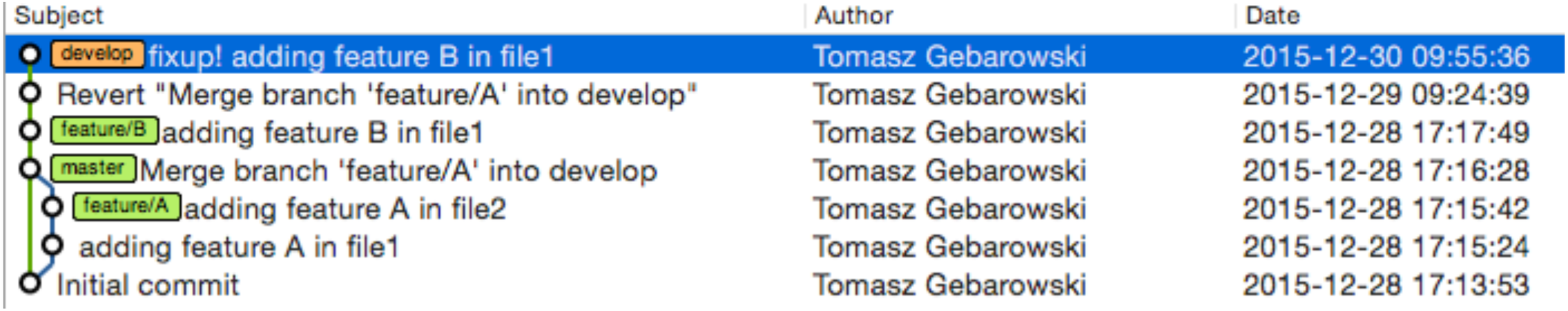
where:
- **N**, number of commits we want to go back to rewrite history
- **SHA** of previous commit before the commit we want to include in our history rewrite

git rebase -i HEAD~6



Squashing with **fixup!** (1)

- add commit that is to be squashed with one of the commits from history
- prefix it with **fixup!** and add the same commit message as the commit that is rewritten



Squashing with **fixup!** (2)

- rebase with autosquash option

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

```
pick 8844119 adding feature B in file1
fixup ed6d885 fixup! adding feature B in file1
pick 5a29779 Revert "Merge branch 'feature/A' into develop"

# Rebase a9c93b9..ed6d885 onto a9c93b9 (       3 TODO item(s))
```

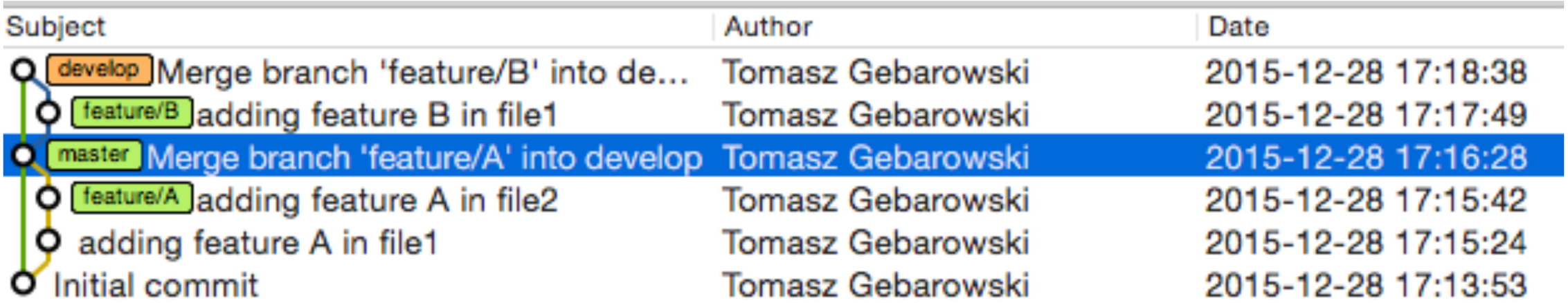
Amending merge commit

`git commit --amend -p` (or --preserve-merges)

`git rebase -i -p`

git will try to preserve the merges when rebasing, rather than linearizing the history

Reverting Merge Commit

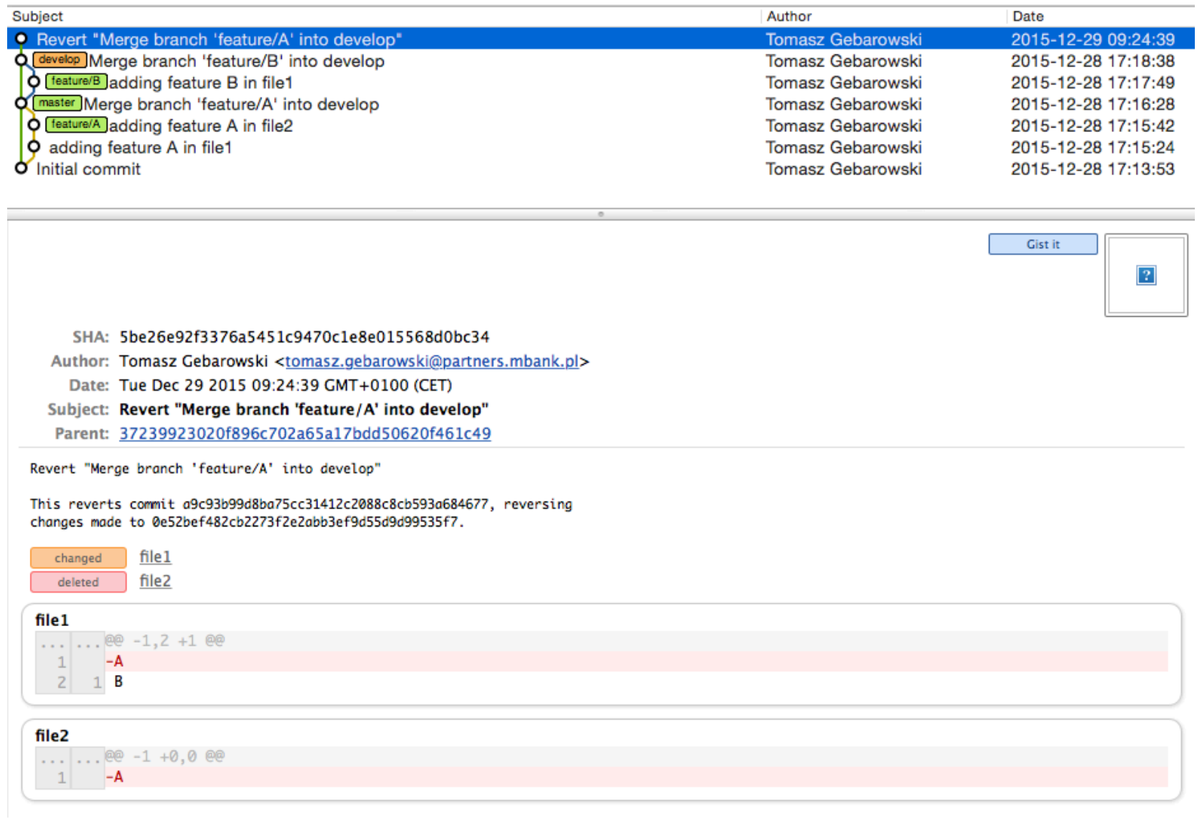



```
git revert -m 1 a9c93b99d
```

where: *a9c93b99d* is Merge Request hash

Reverting Merge Commit

After:



Diff after rebase (?)

Before each rewrite it is advised to tag your current HEAD:

```
git tag v1
```

then after:

```
git rebase -i HEAD~4
```

you can compare what changed after rewrite:

```
git diff v1 HEAD
```

Diff after rebase (2)

What if you forgot to tag before rebase -i?

```
git tag v2 tomasz/feature/rcs
```

(before history got rewritten in remote)

Pitfalls

- Changing commits may result in conflicts
- It takes time to rearranged already committed code

Benefits

- Commits treated as code documentation
- Well organized commits are easier to review
- No problems with git bisect

Clean Git History

Several working trees

Regression tracking

Branch management pro tips

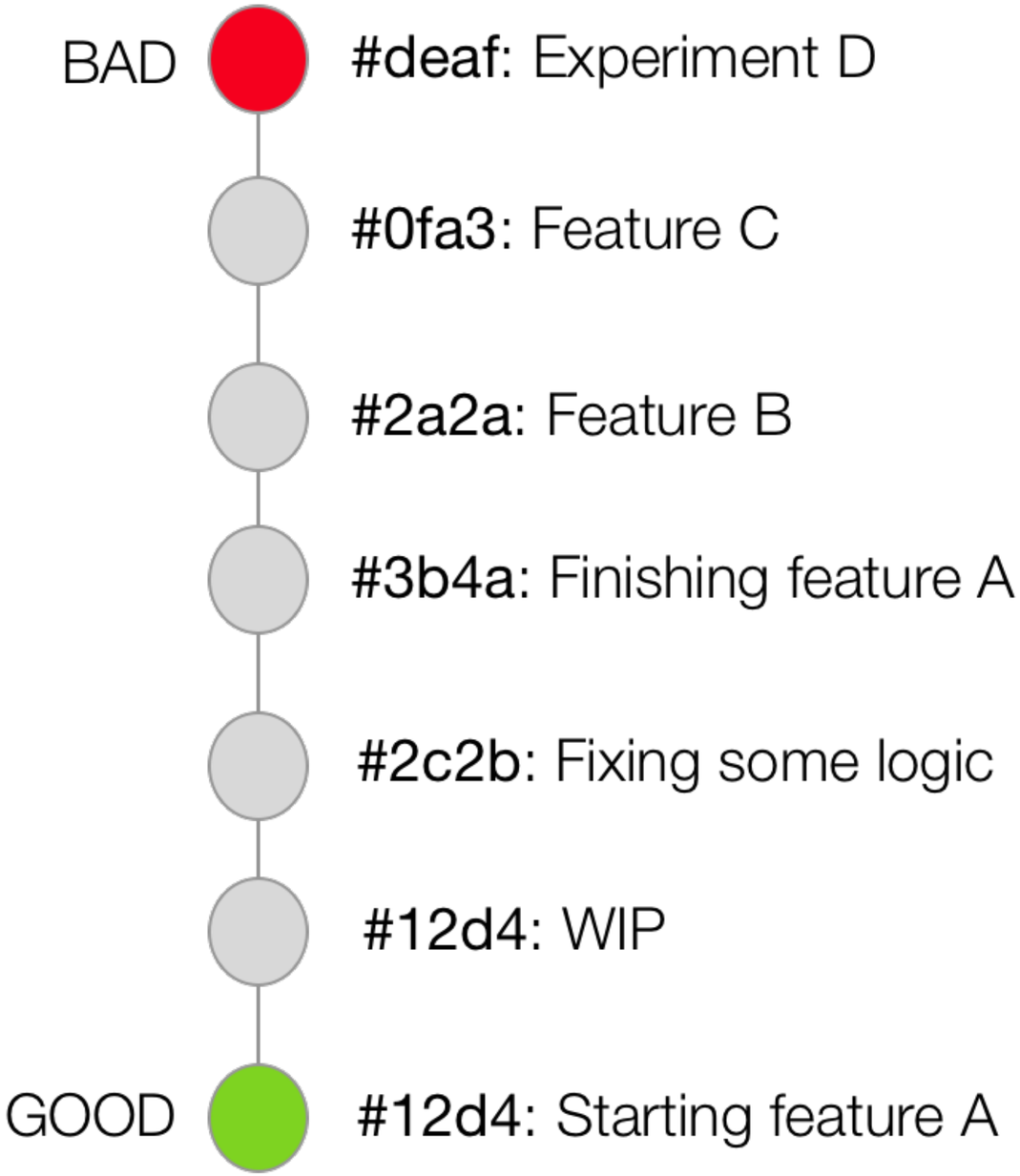
Regression tracking with git bisect

Binary search of commit that caused error

Regression tracking: git bisect

- **Setup**

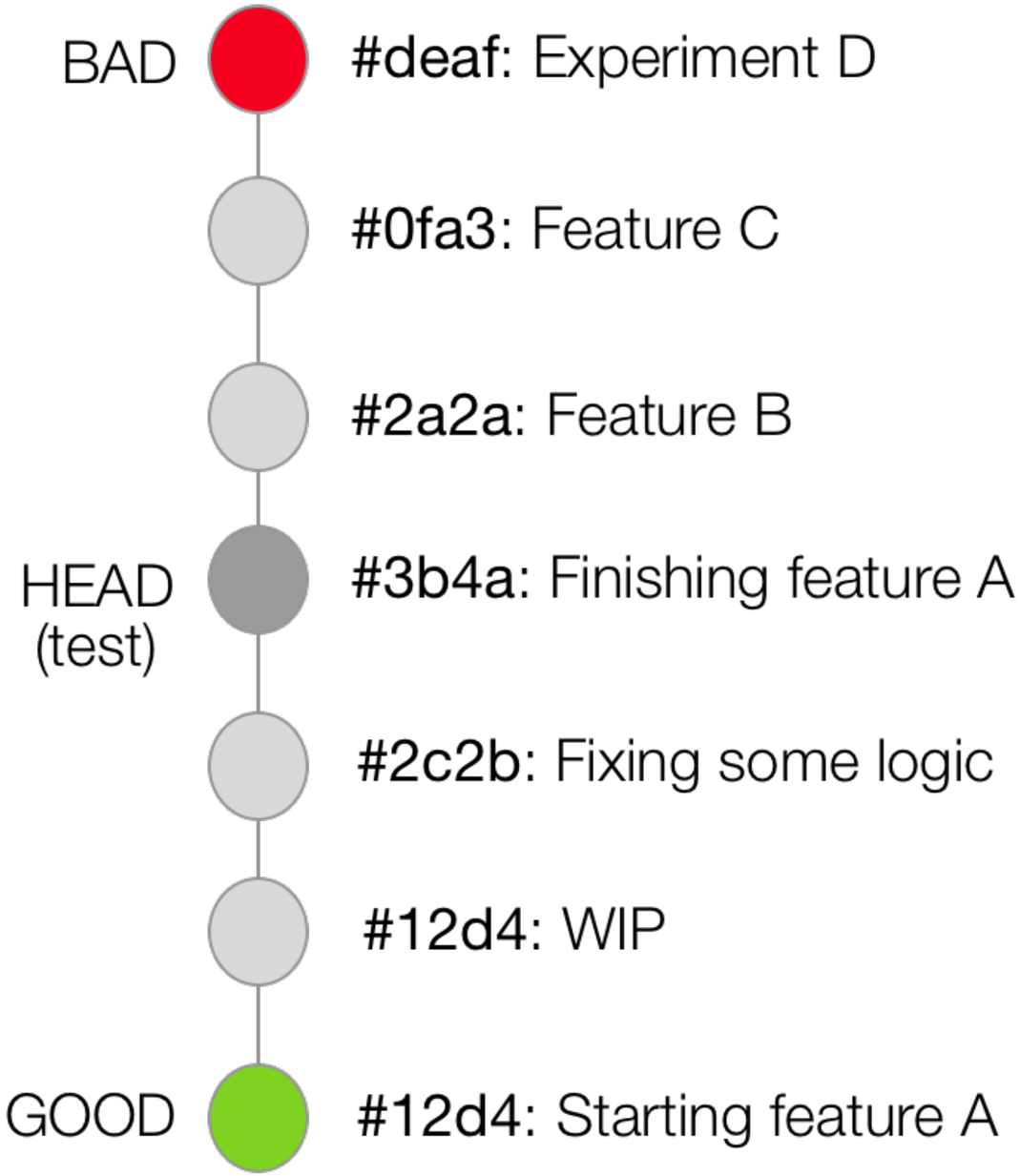
```
$ git bisect start
$ git bisect bad
$ git bisect good 12d4

Bisecting: 3 revisions left to
test after this (roughly 2
steps)
```



Regression tracking: git bisect

- **Test 1**

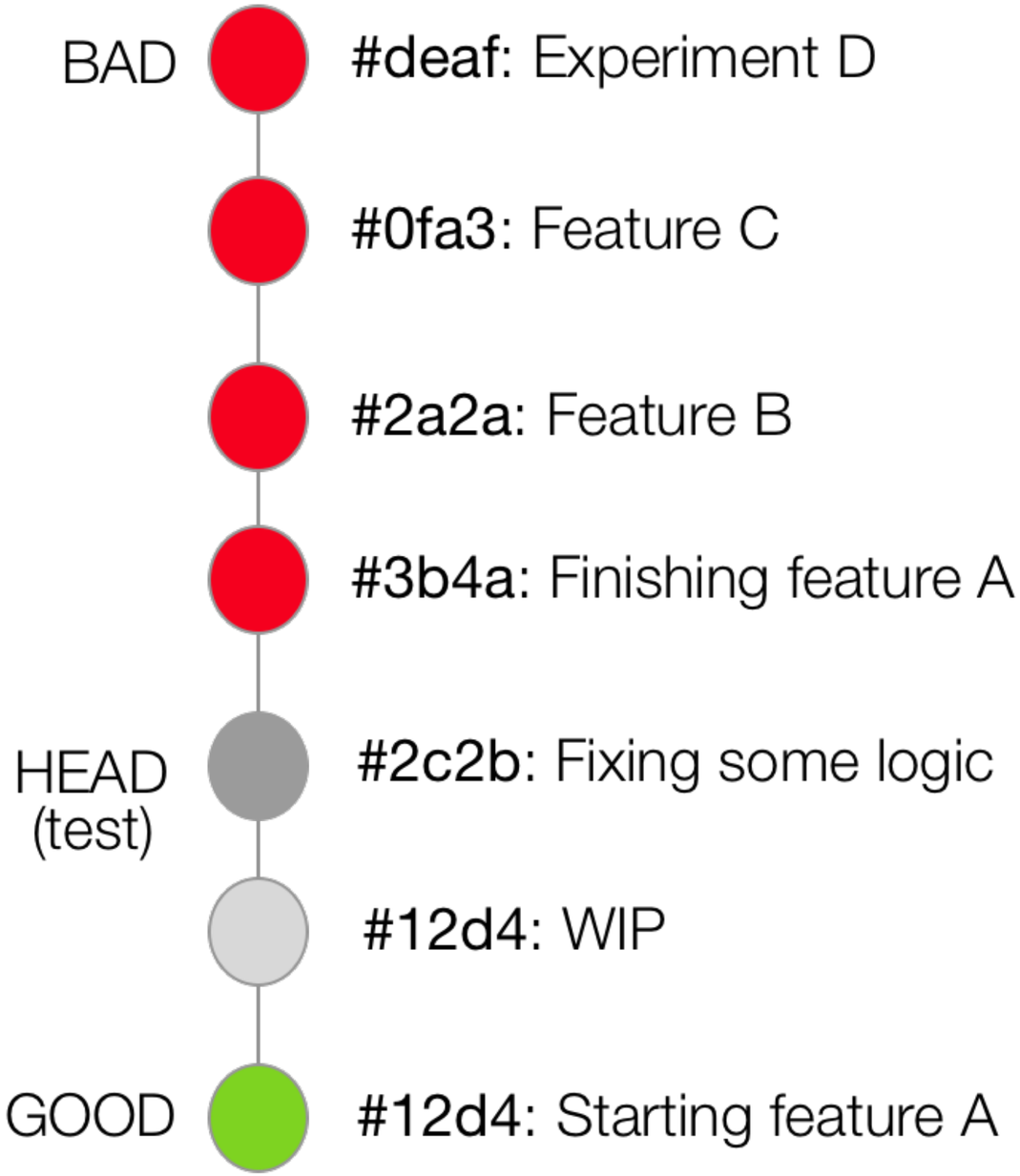
```
git bisect bad
Bisecting: 0 revisions left to
test after this (roughly 0
steps)
```



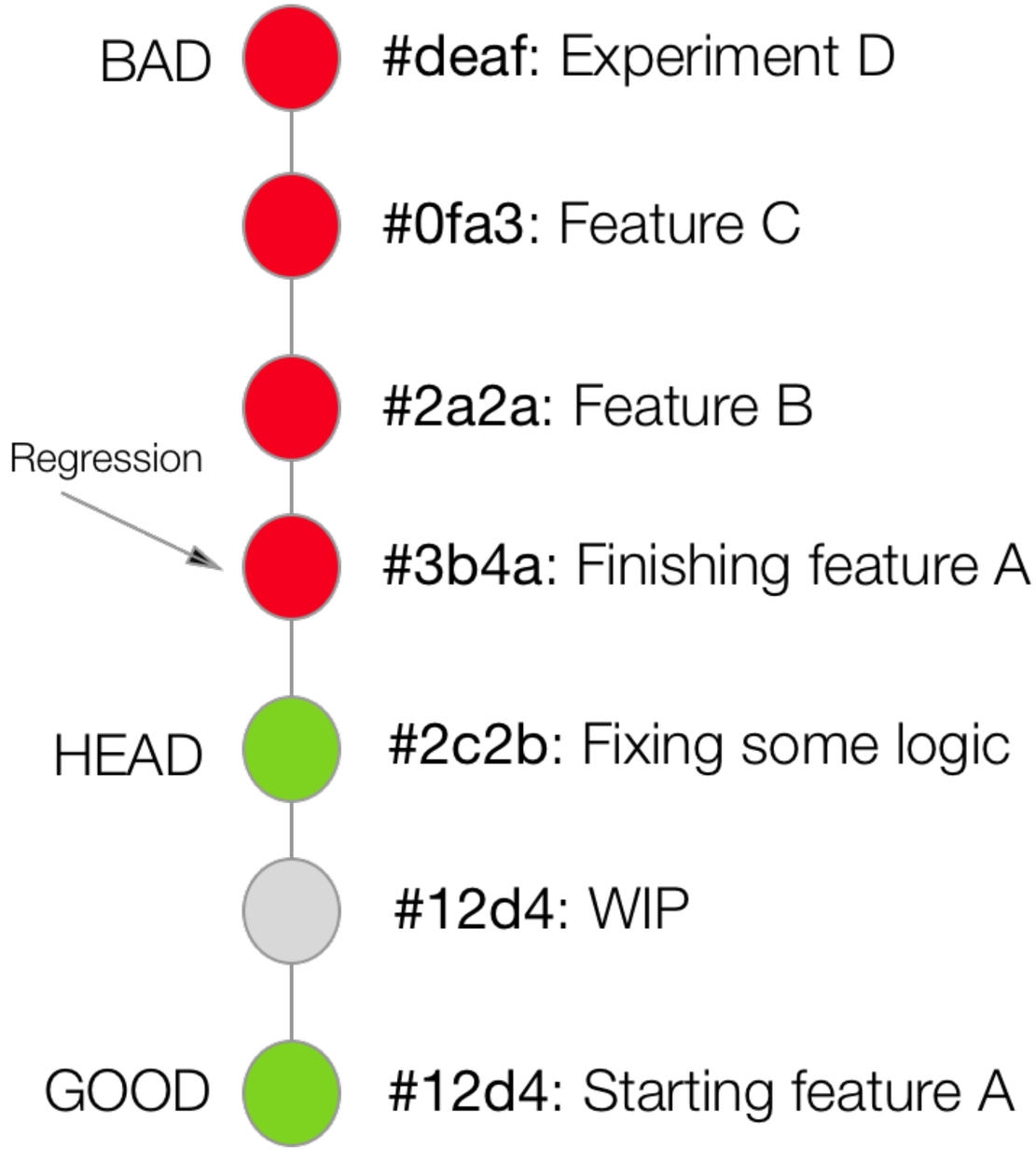
Regression tracking: git bisect

- **Test 2**

```
$ git bisect good
```



Regression tracking: git bisect



- **Results**

`3b4a is first bad commit`

Remember to call `git bisect reset`, to bring back original HEAD state

Automatic regression tracking

```
git bisect start
git bisect bad
git bisect good 12d4
git bisect run ./test.sh
```

test.sh:

```
xcodebuild -project TestProject.xcodeproj -scheme TestProject -sdk iphonesimulator
  -destination 'platform=iOS Simulator,name=iPhone 6,OS=9.3' test
```

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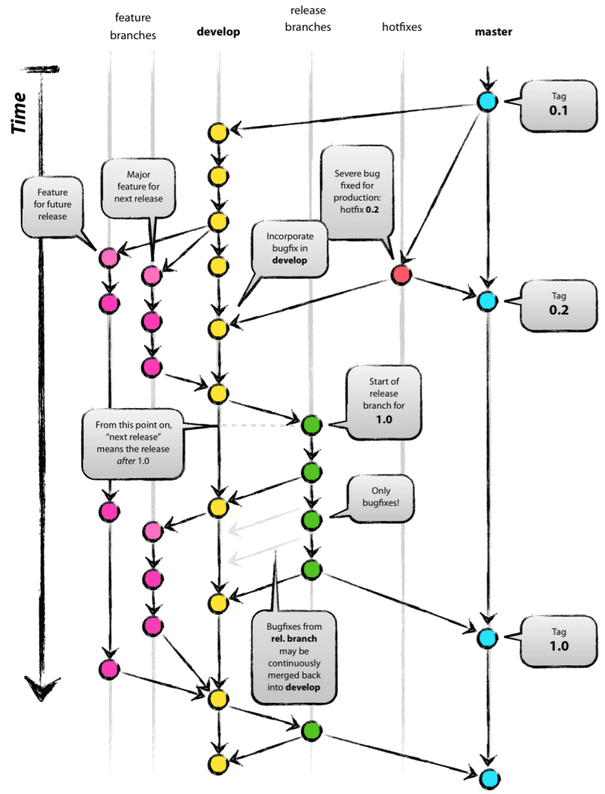
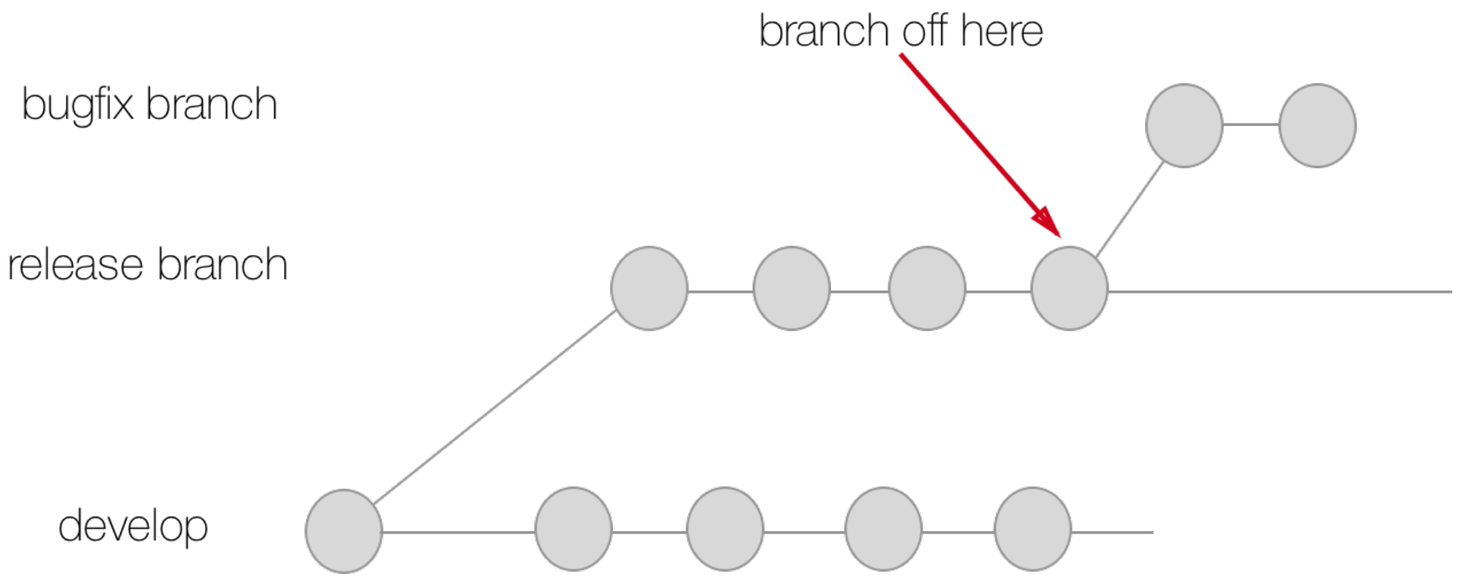
Successful Git Branching Model



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

Proper starting point

- Always branch off from from oldest ancestor, to incorporate feature in all children branches

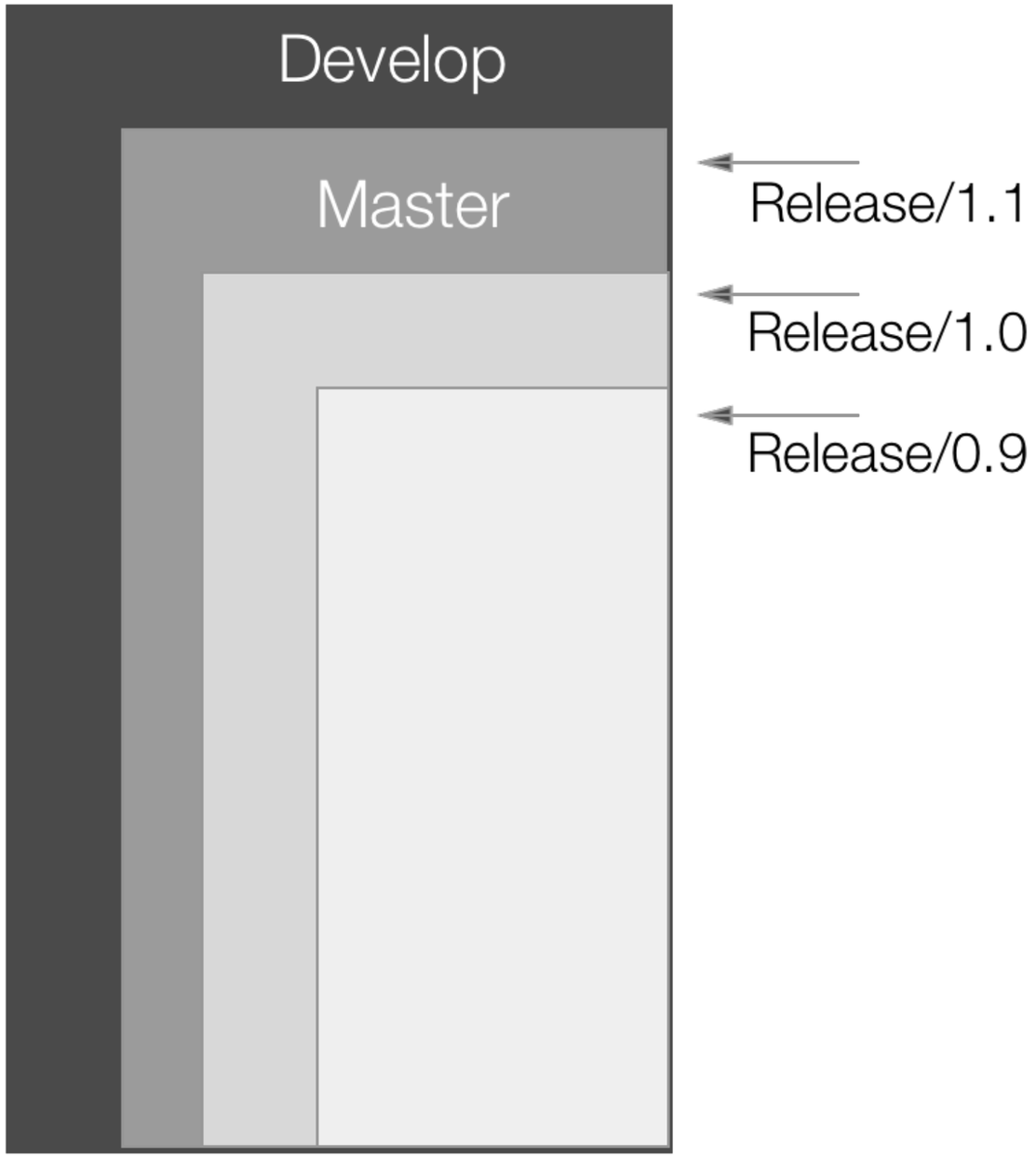


Branch difference tracking (1)

After incorporating changes, this should *ALWAYS* return empty results:

```
git log --no-merges
develop..master
```

```
git log --no-merges
develop..release-1.8
```



Branch difference tracking (2)

Lists commits that are in release-1.2 but not in master:

```
git log --no-merges master..release-1.2
```

Lists commits that are in develop but not in master:

```
git log --no-merges master..develop
```

Listing not merged branches

Remote branches not merged with develop

```
git branch -r --no-merged origin/develop
```

Local branches not merged with develop

```
git branch --no-merged develop
```

beware of cherry-pick

- Cherry-pick is not a silver bullet
- It generates new hash every time
- Do not cherry-pick changes between develop, master and release- branches because git will treat those changes as independent, not related commits

when to use cherry-pick?

- when there is no other choice and changes can't be integrated easily (backporting)
- when working with your local branches

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Several worktrees (1)

Consider following scenario:

- Working on a feature branch
- Urgent hotfix on a master branch

Several worktrees (2)

What would you do?

```
git stash
git checkout master
git checkout -b hotfix
```

Several worktrees (3)

There is better way:

```
git worktree add -b hotfix ../hotfix origin/master
cd ../hotfix
(bugfixing)

git push origin hotfix
(pull request)

cd ../main
rm -rf ../hotfix
(cleanup)
```

what about live demo?

Thank You

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presentation:
https://github.com/tgebarowski/mobile-warsaw-git-presentation