

Narrowing Commit Scope To Isolate Bug Fixes And Increase Team Effectiveness

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What is it and why is it useful?

Takes large commits and isolates bug fixes

- Takes a single commit that “Added feature Q and Fixed Bug X and Fixed Bug Y and Fixed Bug Z” -> Multiple commits that “Added Feature Q”, “Fixed Bug X”, “Fixed Bug Y”, and “Fixed Bug Z”
 - Separates the commit by turning bug fixes into their own commits

Smaller commits with specific tasks allow for better team effectiveness

- While users should do this, in practice programmers often have commits that do too many different tasks
- Allows team members to see exactly what part of the commit fixed which bug
- Allows for easier reverts of the other part of the commit without re-introducing the bugs

Past Approaches and Our Idea

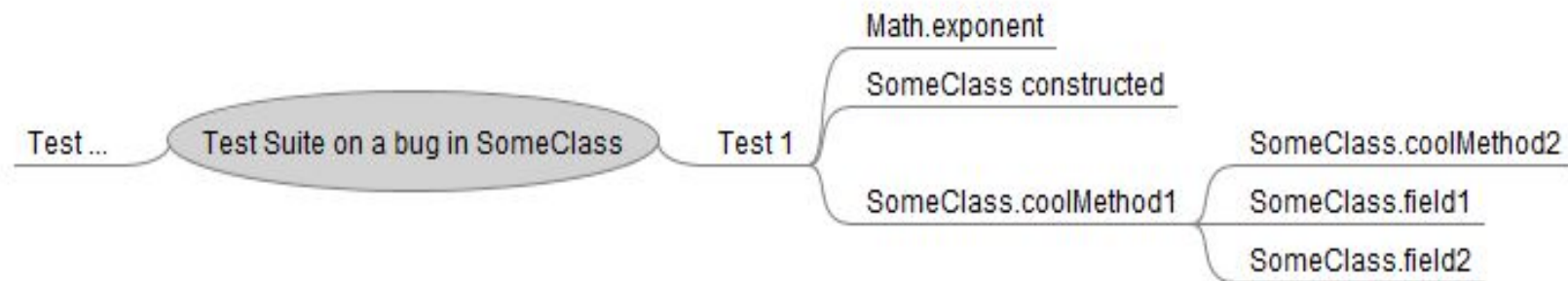
Past Approach: Experimentally Remove Lines

- One approach was to experimentally remove subsets of the changed lines in a commit to see find the smallest subset of lines necessary
 - Use a test suite with each removal to see if the bug is still there
 - Biggest Problem: very expensive w/ around 2^{lines} test runs on a large commit

Our Idea: Find where the changes to the bug fix actually happened

- Inspired by the approach above
- Create a dependency tree to find everything the tests directly/indirectly call
- Allows us to approximate the bug's "sphere of influence", so we can use the above approach on a much smaller portion of the user's code
- If done correctly, the sphere of influence is very isolated, so finding which lines fix the bug is easy -> they become their own commit

Our Idea and Challenges



Big Challenge: requires the user to moderately change coding/testing behavior

- Many smaller problems in the implementation details, but those are less important
- The dependency tree only reduces the work of that approach if the calls from the tests and code are confined to a small region
- This is reasonable if the code is kept modular and the tests run specifically on that module, not on the whole codebase