

# Mea culpa: How developers fix their own simple bugs differently from those of other developers

Wenhan Zhu, Michael W. Godfrey

University of Waterloo

07 May 2021

# Bug fixing in Open Source Software (OSS)

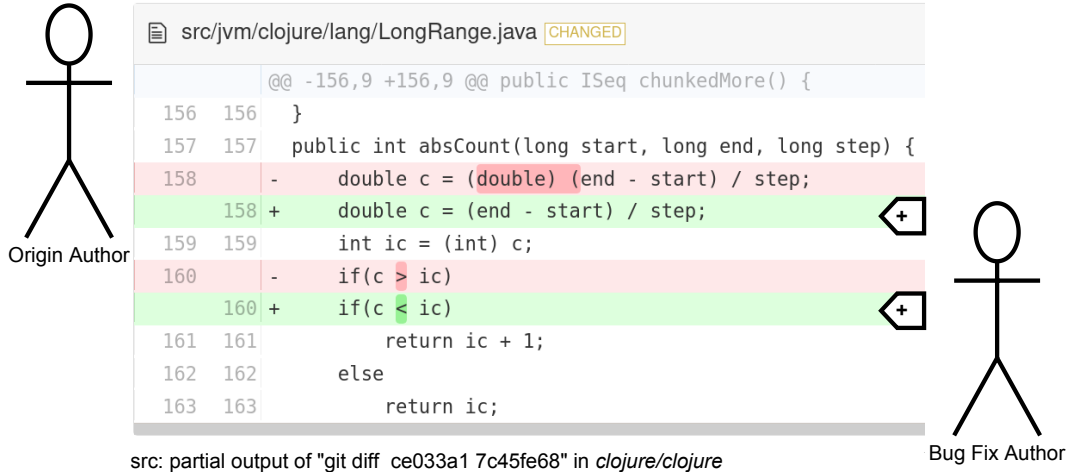


Figure 1: Example git diff

# Dataset collection

- 10,231 SStuBs from the top 100 Maven projects by popularity

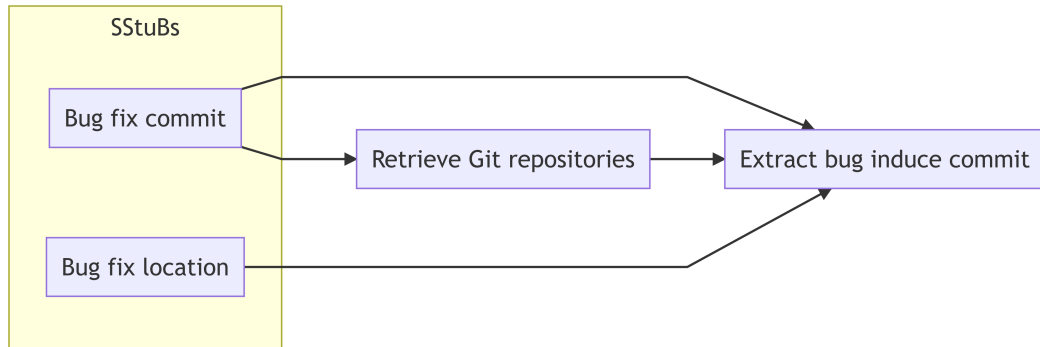


Figure 2: Extracting bug induce commit

# Adapting the SZZ algorithm to git

Integration (e.g., C6) vs Implementation (e.g., C4)

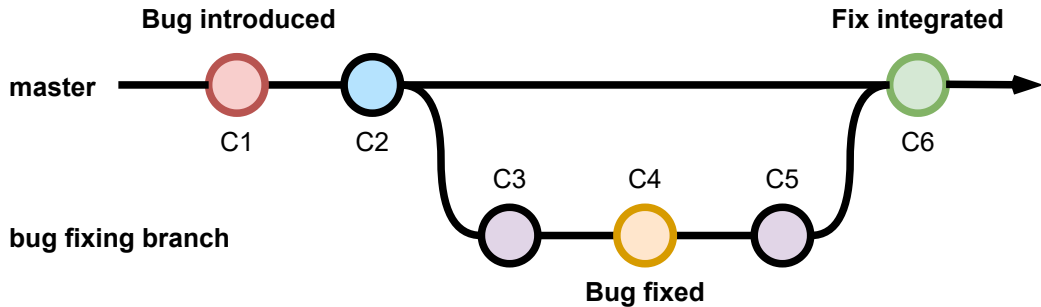


Figure 3: Example git tree

# Determine commit attributes

## Authorship

The author information stored in a *Git* commit

## Bug fixing time

Time difference between bug induce and bug fix

## Commit size (i.e., Churn)

Sum of added and removed lines

# Developers fix their own simple bugs about half of the time

Table 1: Bug fixes by authorship

Fixed by same author	Fixed by a different author	Total
5,674	4,508	10,182

Bug fixes by same author is fast and often within the same day

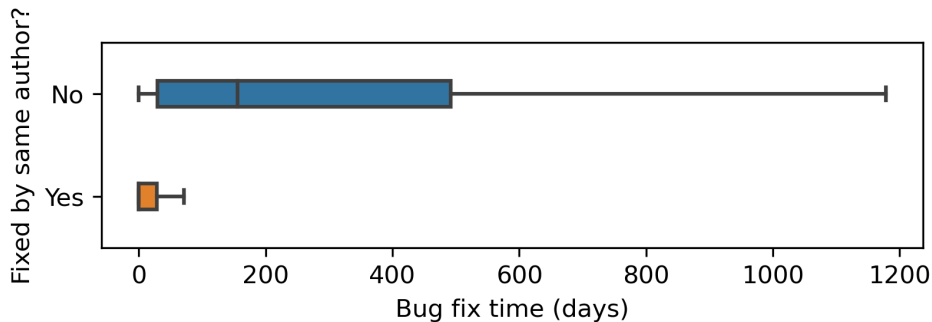


Figure 4: Distribution of bug fix time by authorship

Bug fixes by same author is larger in size and varies widely

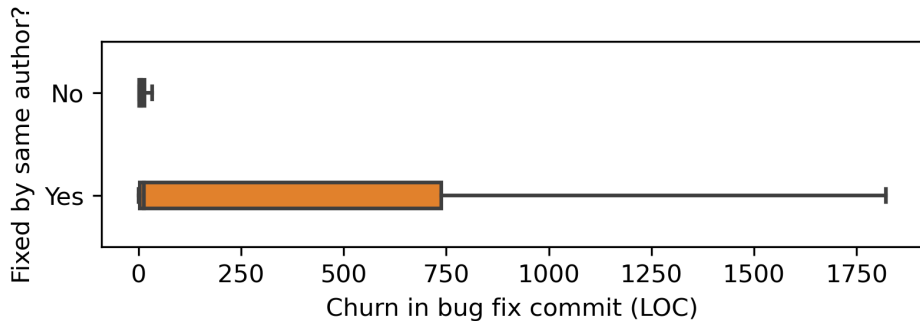


Figure 5: Distribution of bug fix size by authorship



# Patterns of fixing simple statement bugs

## Fixed by same developer:

- Fixed soon after bug introduced
- Fix often embedded inside larger commit that “does more”

## Fixed by different developer:

- Fix often occurs after a significant delay
- Fix is short, basically just fixes the bug and nothing more

# Summary

## Dataset collection

- 10,231 SStuBs from the top 100 Maven projects by popularity

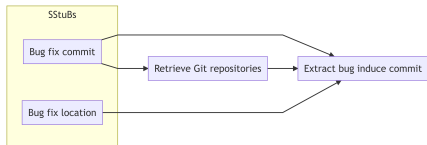


Figure 2: Extracting bug induce commit

## Bug fixes by same author is fast and often within the same day

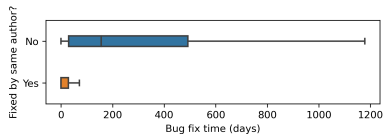


Figure 4: Distribution of bug fix time by authorship

## Bug fixes by same author is larger in size and varies widely

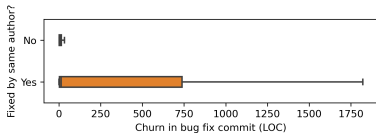


Figure 5: Distribution of bug fix size by authorship

## Patterns of fixing simple statement bugs

### Fixed by same developer:

- Fixed soon after bug introduced
- Fix often embedded inside larger commit that "does more"

### Fixed by different developer:

- Fix often occurs after a significant delay
- Fix is short, basically just fixes the bug and nothing more