

*Take nothing on its looks; take everything on evidence.
There's no better rule.*

Charles Dickens, "Great Expectations."

Repairing Bugs in Conditional Expressions

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Context

So far, the Universe is winning.

Bug fixing continues to be a mostly manual, time consuming, and therefore expensive activity in software development.

Hoang Duong Thien Nguyen et al, "SemFix: Program Repair via Semantic Analysis"

Case study

Commons Math

```
public static int gcd(int u, int v) {  
    if (u * v == 0) {  
        return (Math.abs(u) + Math.abs(v));  
    }  
    // ...  
}
```

```
assertEquals(3 * (1<<15)  
            , gcd(3 * (1<<20), 9 * (1<<15)));
```

Case study

Commons Math

```
public static int gcd(int u, int v) {  
    if ((u == 0) || (v == 0)) {  
        return (Math.abs(u) + Math.abs(v));  
    }  
    // ...  
}
```

State of the art



SemFix: Program Repair via Semantic Analysis

- Statement ranking (Tarantula)
- Symbolic Execution (KLEE) → Repair Constraint
- Program Synthesis (SOLFP -paper-)

GenProg: A Generic Method for Automatic Software Repair

Claire Le Goues, ThanhVu Nguyen, Stephanie Forrest, Westley Weimer

ClearView, AutoFix-E, Gopinath et al, Pachika.

Unwillingness to share code.

Problems

Test quality

Quality is free, but only to those who are willing to pay heavily for it.

Tom DeMarco, Peopleware

Resources (time, code monkeys, knowledge, tools, etc.).

Seeded and wild bugs.

Generated patches vs. reality.

Conclusion

Contribution

Can't and shouldn't.

