London Hopper Colloquium 2018

Research Spotlight Competition

Type Errors, Delta Debugging, and the Blackbox Compiler

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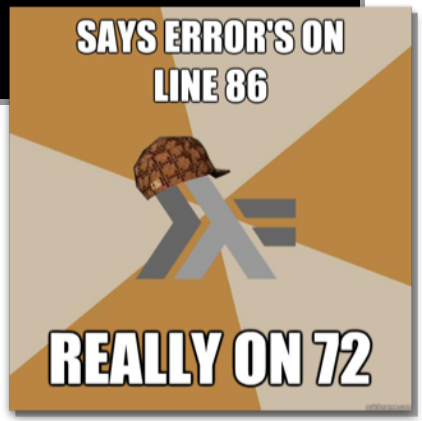
Why do we care?

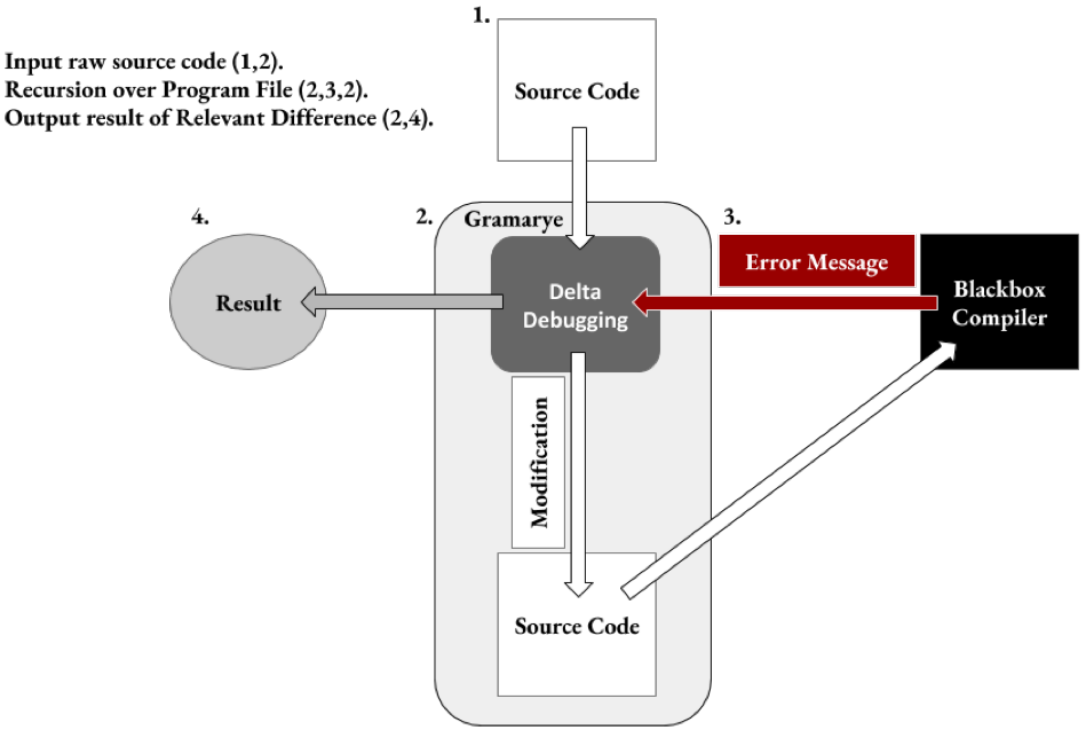
```
Insert.hs:2:27: error:
    • Occurs check: cannot construct the infinite type: a ~ [a]
    • In the expression: y : insert x ys
      In an equation for ‘insert’:
          insert x (y : ys)
            | x > y = y : insert x ys
            | otherwise = x : y : ys
    • Relevant bindings include
        ys :: [a] (bound at Insert.hs:2:13)
        y :: a (bound at Insert.hs:2:11)
        x :: a (bound at Insert.hs:2:8)
        insert :: a -> [a] -> [a] (bound at Insert.hs:1:1)
  |
2 | insert x (y:ys) | x > y = y : insert x ys
  |                            ^^^^^^^^^^^^^^^^
```



Type errors cause hours of frustration…

…hours…and hours…

An illustration of our method



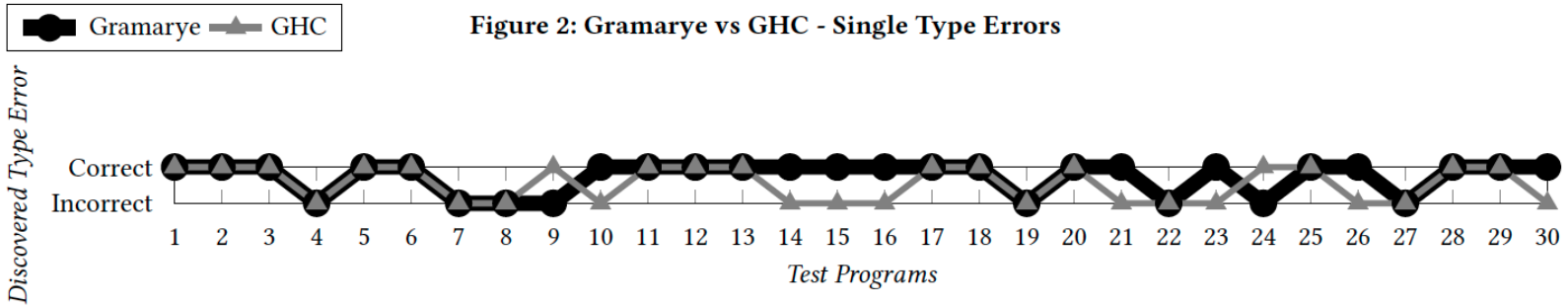
- Delta Debugging* - Decides the modification of two programs
- Blackbox Compiler - Returns the result of the modifications
- Manipulating Source Code - Lines of code added and removed

*Andreas Zeller. 2009. Why Programs Fail.

Results

77% correct locating over GHC at 50%

53% accuracy reported over GHC at 40%



Future Work

- Investigate the outliers
- Evaluate the non-determinism of the algorithm's choices