Slicing in Maintenance

Gallagher/Lyle ‘91

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The Big Idea

• Improve maintenance by using slicing to
decompose programs into independent
chunks
• Prohibit changes that could ripple beyond
the current chunk
  – They prove that allowed changes cannot affect
    anything not shown in the current chunk
• Recombine after modification and testing

Why does the Big Idea matter?

• Gives the programmer a smaller program by
  eliding code that is not relevant to the
current problem
• Guarantees that all relevant code is present
• Guarantees that allowed changes won’t
  affect elided code
• Prior experience suggests that this should
  have a big impact on maintenance

The Small Idea

• “New and Improved” Software
  Maintenance Process Model
• Key Ideas:
  – Depend on slices to minimize undesired side
effects.
  – Test changes in the decomposition slice
  – Skip regression testing (!!!)
Problems with the “New and Improved” model

• Lack of evaluation
  – That’s OK, as this is a suggestion to be evaluated in the future

• Skip regression testing???
  – Might be OK to skip a regression test when
    • ALL variables it depends on are in the complement of the current slice
    • NO variable it depends on is in the changeable part of the current slice
    • BOTH of the above are known to be true

Limitations and future work

• Problems with scalability
• Empirical evaluation not yet done
• Precision of slicing
  – E.g. Are the decomposition slices small enough to be worthwhile?
• Practical system not yet demonstrated

Research Strategy -- I

• These ideas are all in Redwine/Riddle’s Development & Extension Phase
• Decomposition Slices are treated as an Enhanced Method
• Applying Decomposition Slices to Maintenance is treated as applying a method to a new area
• The “New and Improved” Maintenance Process is proposed as a Radical Solution

Research Strategy -- II

• Building blocks for both parts of the Big Idea are:
  – Question: Method/Means
  – Strategy/Result: Technique
  – Validation: Analysis
• This is fine!
Research Strategy -- III

- Building Blocks for the Small Idea are:
  - Question: Method/Means
  - Strategy: Technique
  - Validation: Assert that it works!
- Bad plan...

In Summary

- A high-quality paper
- Widely cited
- Major ideas well developed
- Claims a bit too much in one small area
- 10 years later: Slices turn out to lack precision and cost too much to compute for real programs.