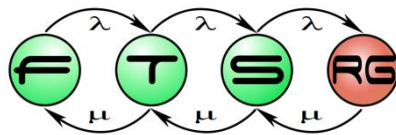# Towards Using Multiple Counterexamples for Abstraction Refinement

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Context

- Abstraction refinement-based model checking
- Research question: considering multiple counterexamples
  - Overhead, but possibly better refinements

Counterexamples

Abstractor ⟶ Refiner

Refined precision

✓   ✗
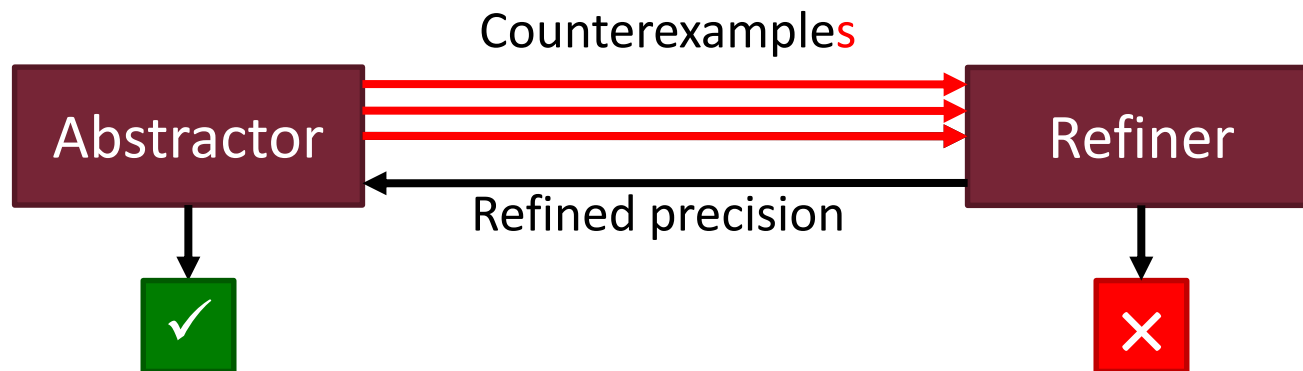
- Preliminary experiments
  - Theta framework, github.com/FTSRG/theta (presented at FMCAD, Thursday)
  - HWMCC, SV-COMP, PLC models

Counterexample Structures
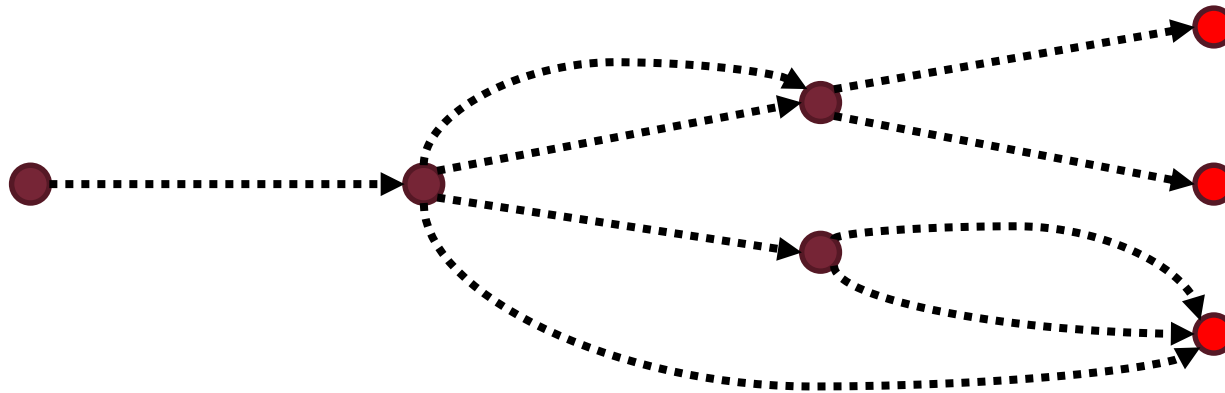
- ## Multiple paths to a single erroneous state

Prefix
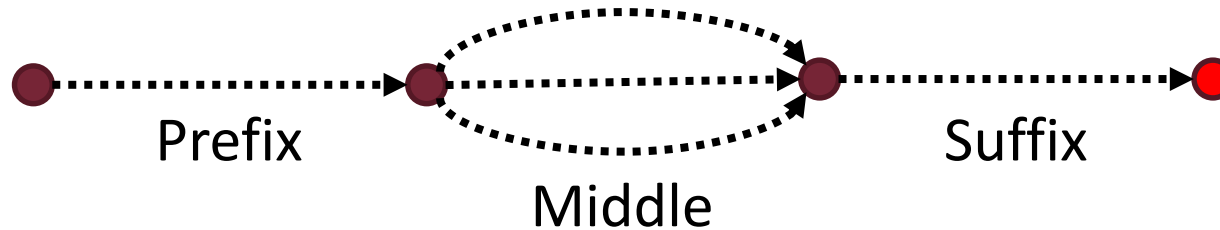
Middle

Suffix

- ## Refinement ideas

  - Prefix/suffix: no benefit

  - Middle: refine all counterexamples at once

    - Fewer but larger iterations

    - Explore k counterexamples → configurable

Counterexample Structures
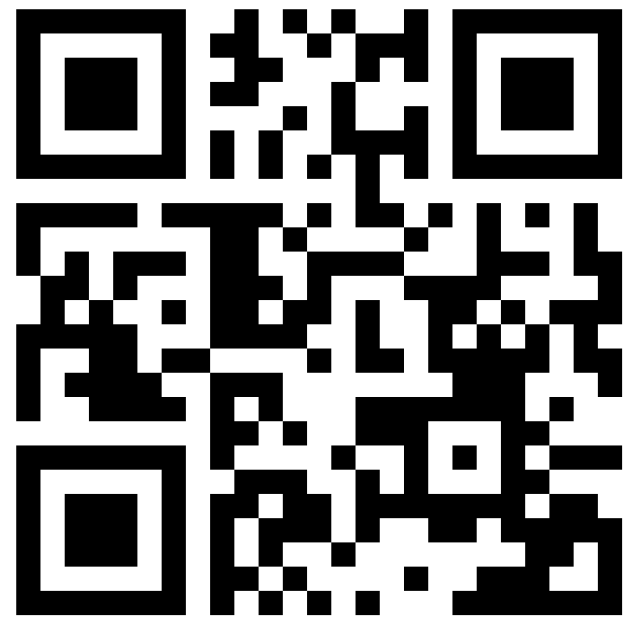
- **Multiple paths to multiple erroneous states**

- **Refinement ideas**
  - Prefer early pruning strategy
  - Determine (coarsest) common precision

Summary

- Preliminary results are interesting
- Plans
  - Develop and implement refinement ideas
  - More inputs, more thorough experiments

inf.mit.bme.hu/en/members/hajdua

github.com/FTSRG/theta