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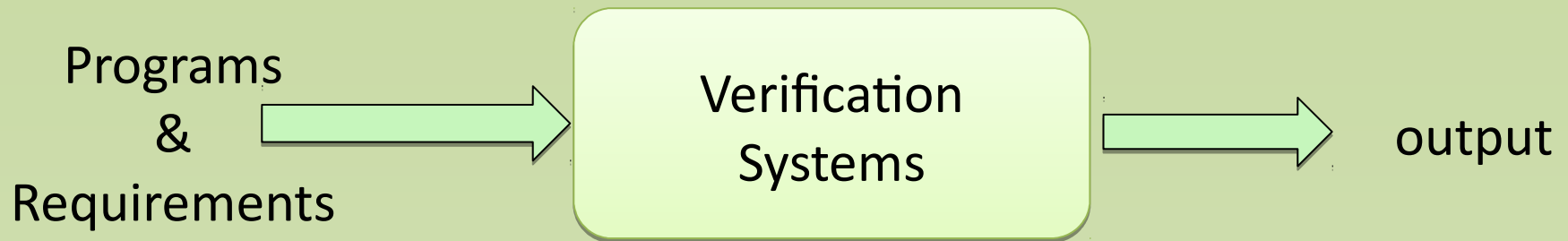
Software Testing a Verification System

Mahmoud A. Bokhari Markus Wagner

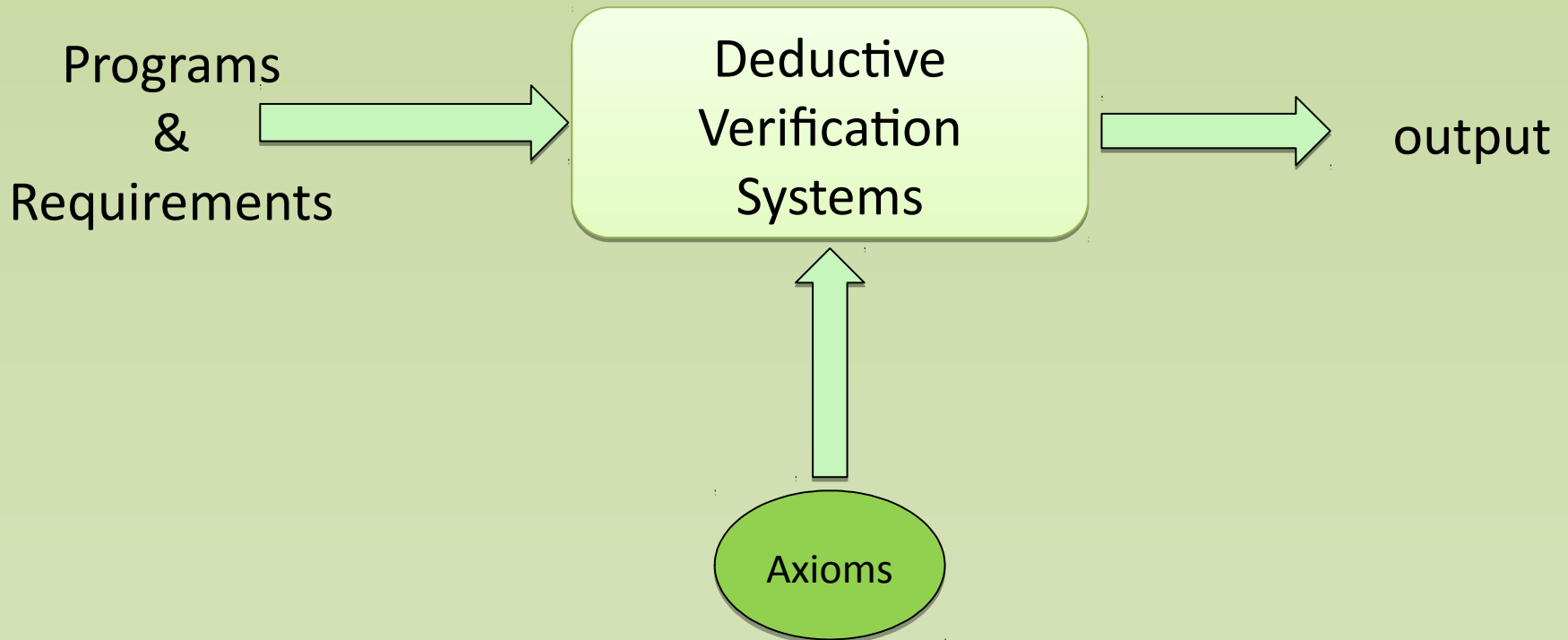
Outlines

- Introduction
 - Verification Systems
 - Axioms
 - Beam Search
- Objectives
- Methods
- Case Study: KeY System
- Experimental Results

Verification Systems

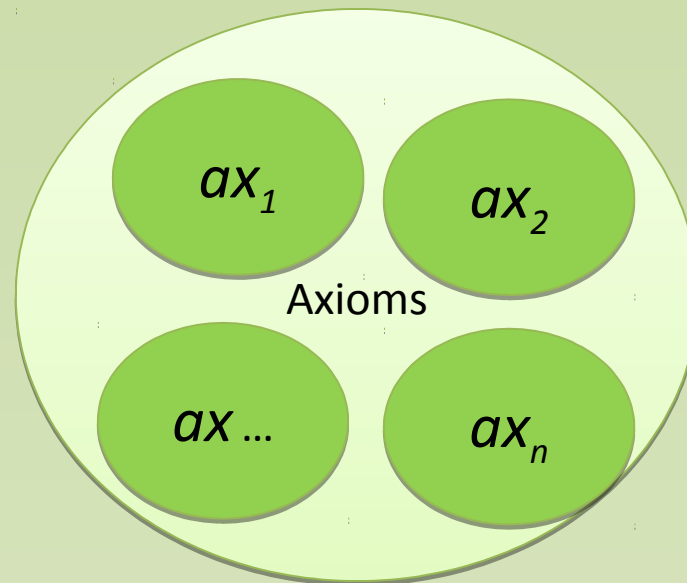


Verification Systems



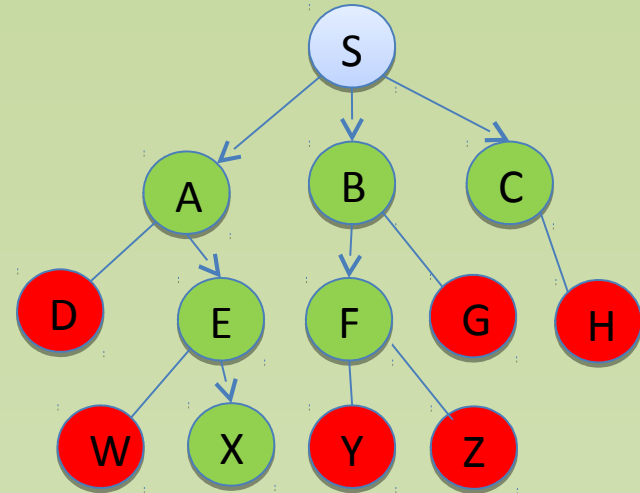
Axioms

- Axioms
 - Set of rules.
 - Help to understand the software.
 - Encode semantics.



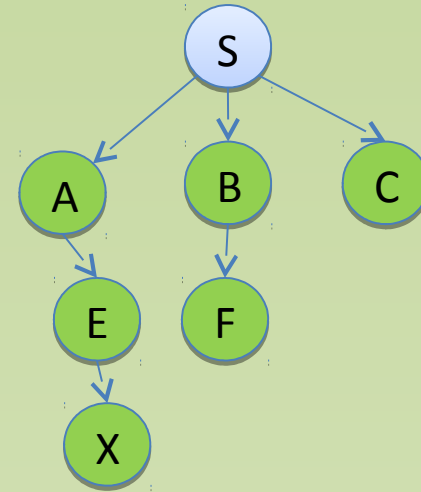
Beam Search

- Heuristic.
- Explores promising nodes.



Beam Search

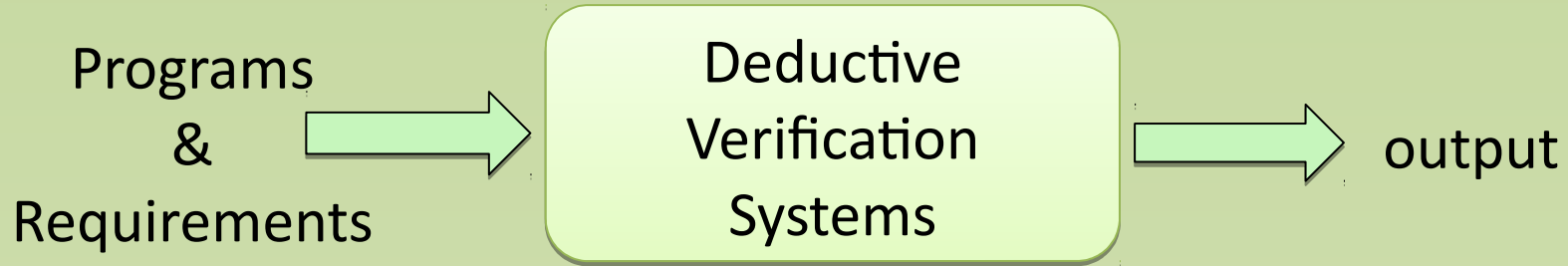
- Heuristic.
- Explores promising nodes.



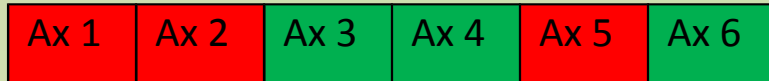
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Objectives



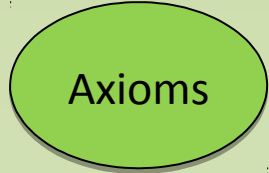
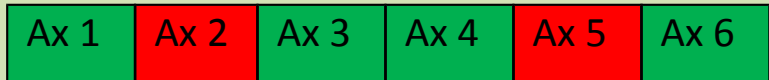
TC1



TC2



Union



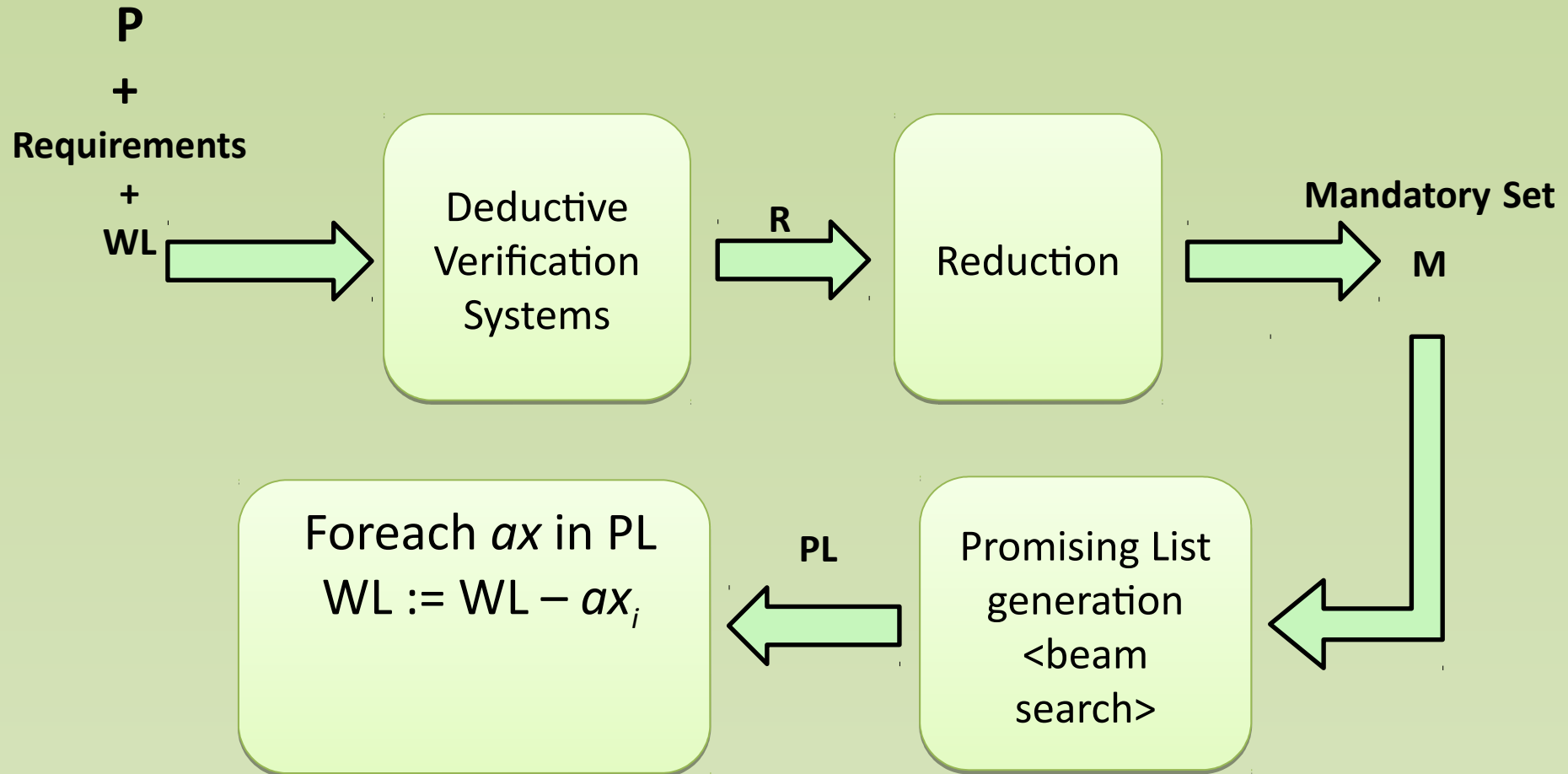
Maximise the axiomatisation coverage.

Uncover hidden defects within the axiomatisation base.

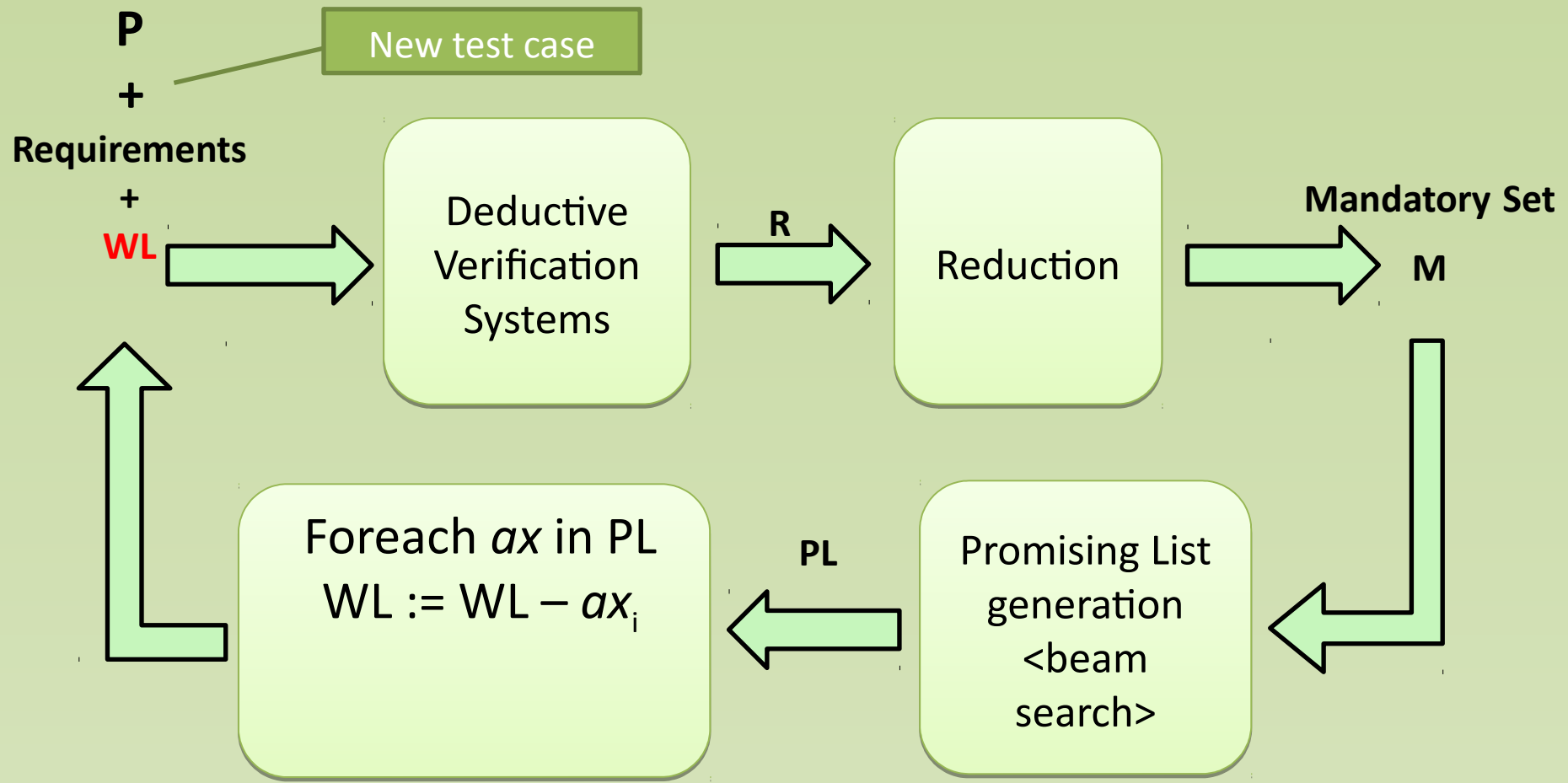
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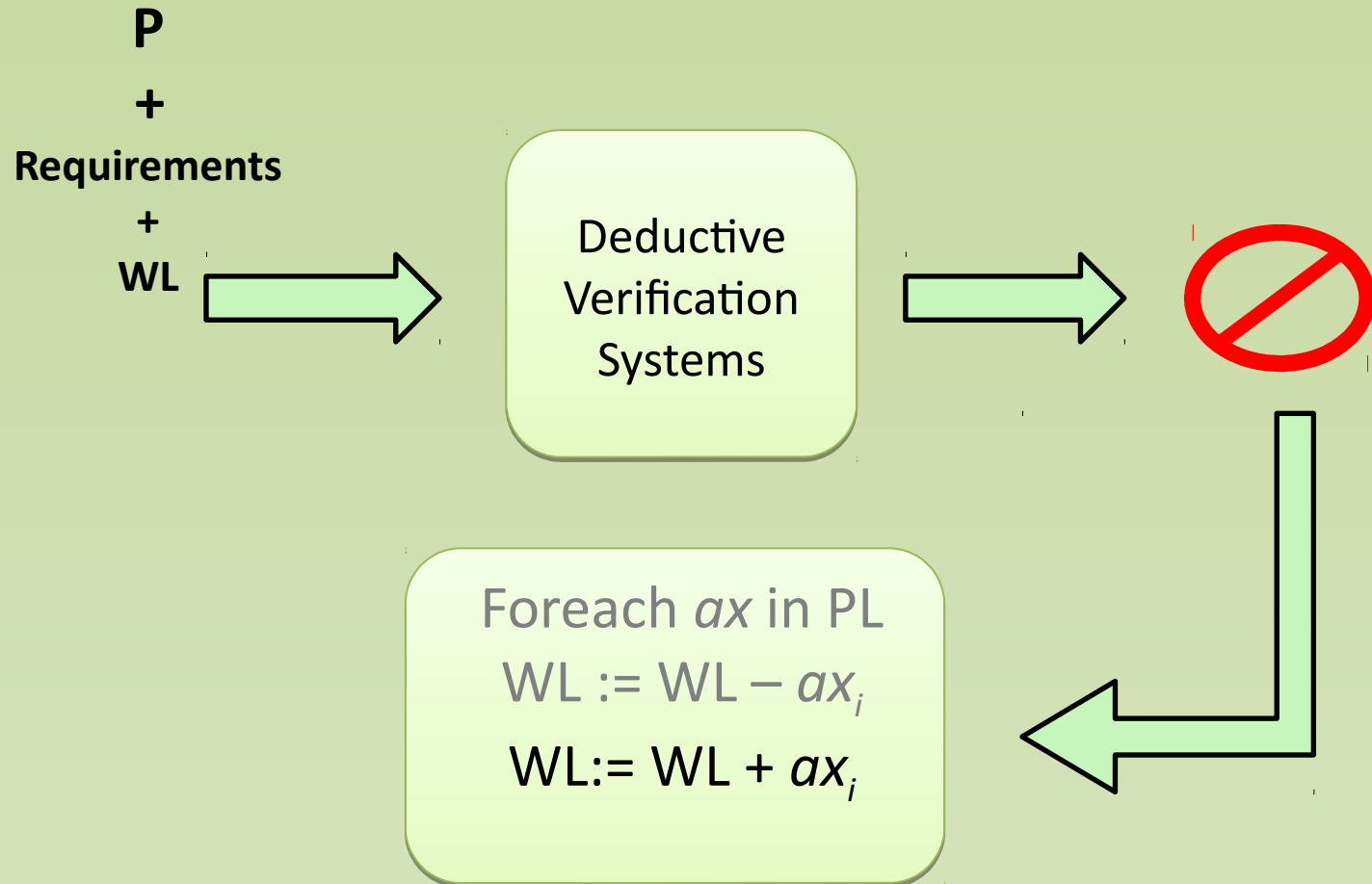
Test Case Generation



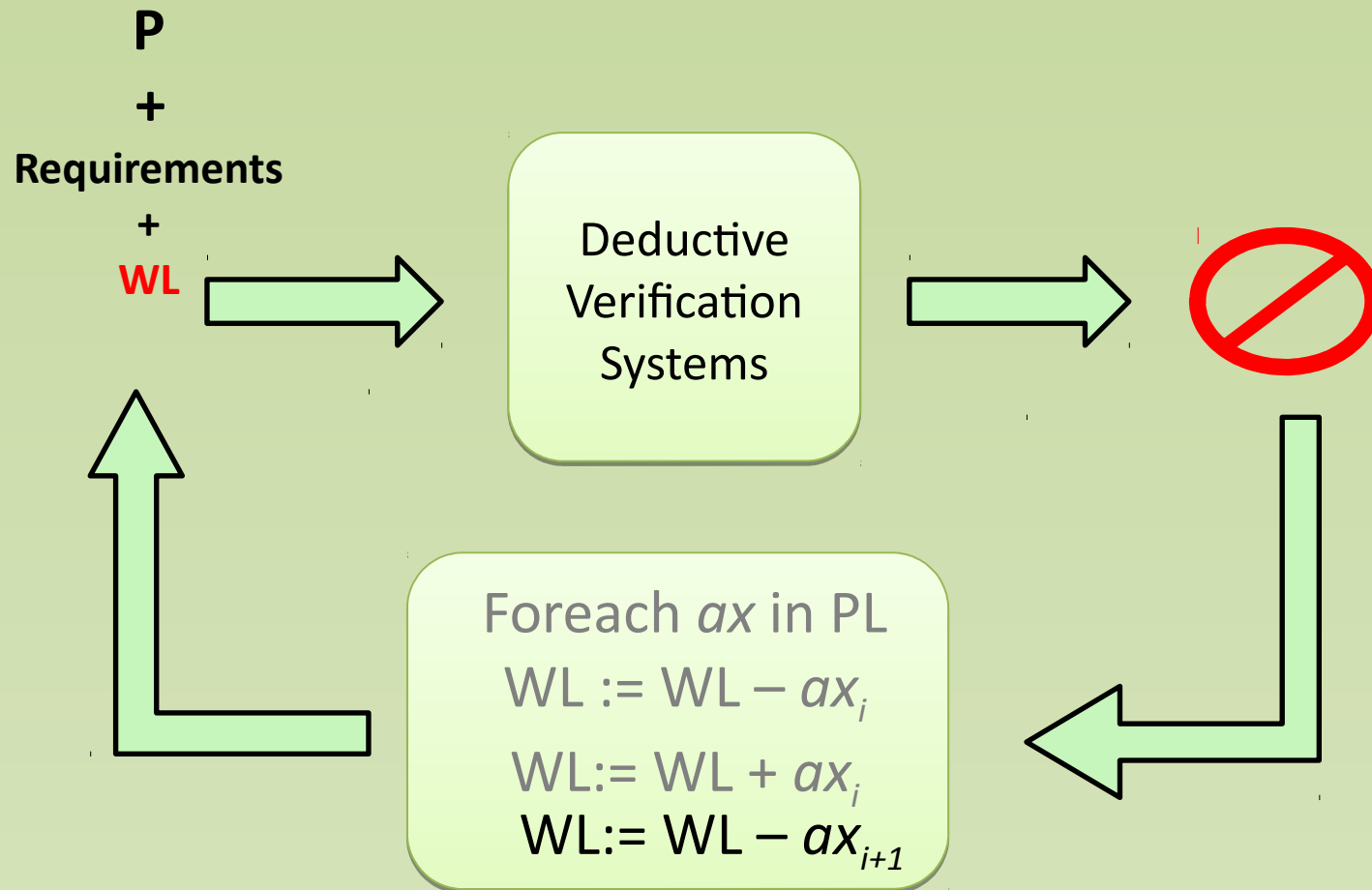
Test Case Generation



Test Case Generation



Test Case Generation



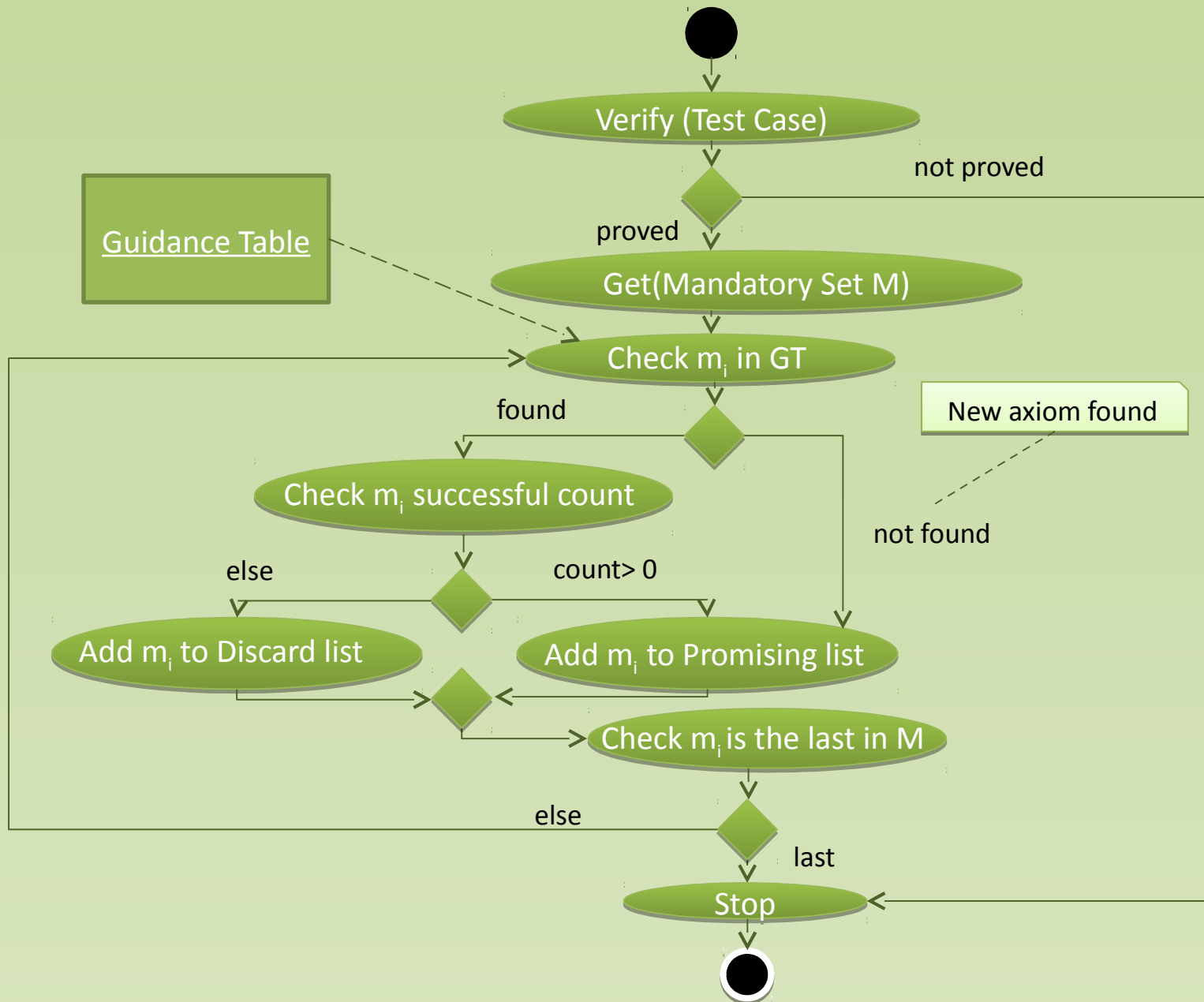
Guidance Table

The main idea is to guide the search process.

The diagram shows two callout boxes at the top. The left box, labeled 'Dropped axiom', has a red circle around the 'Axiom' column header in the table below. The right box, labeled 'Alternative axioms', has a red circle around the 'Replacement sets' column header in the table below.

| Axiom | Replacement sets | Successful | Total Successful | Unsuccessful |
|-------|------------------|------------|------------------|--------------|
| A1 | {A3,A5} | 1 | 1 | 0 |
| A100 | {A4} | 3 | 4 | 2 |
| | {A10, A6} | 1 | | |

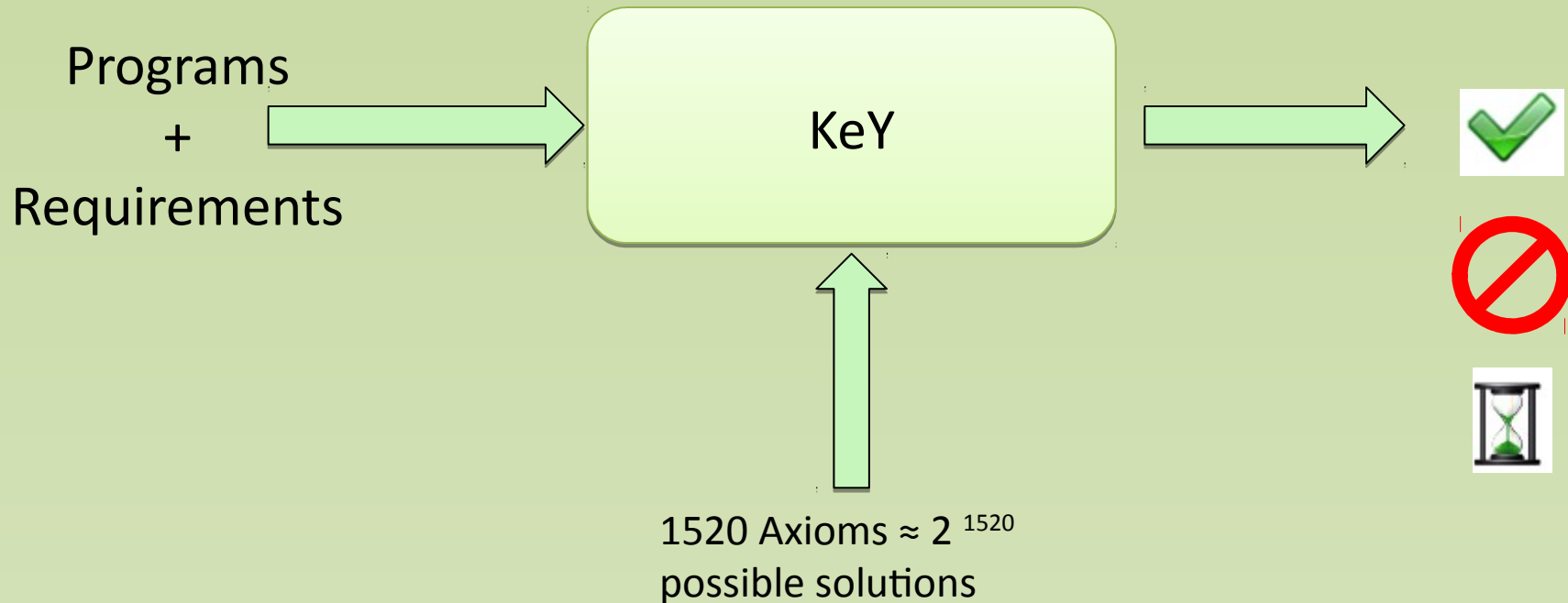
Beam Search Algorithm



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Case Study: KeY System



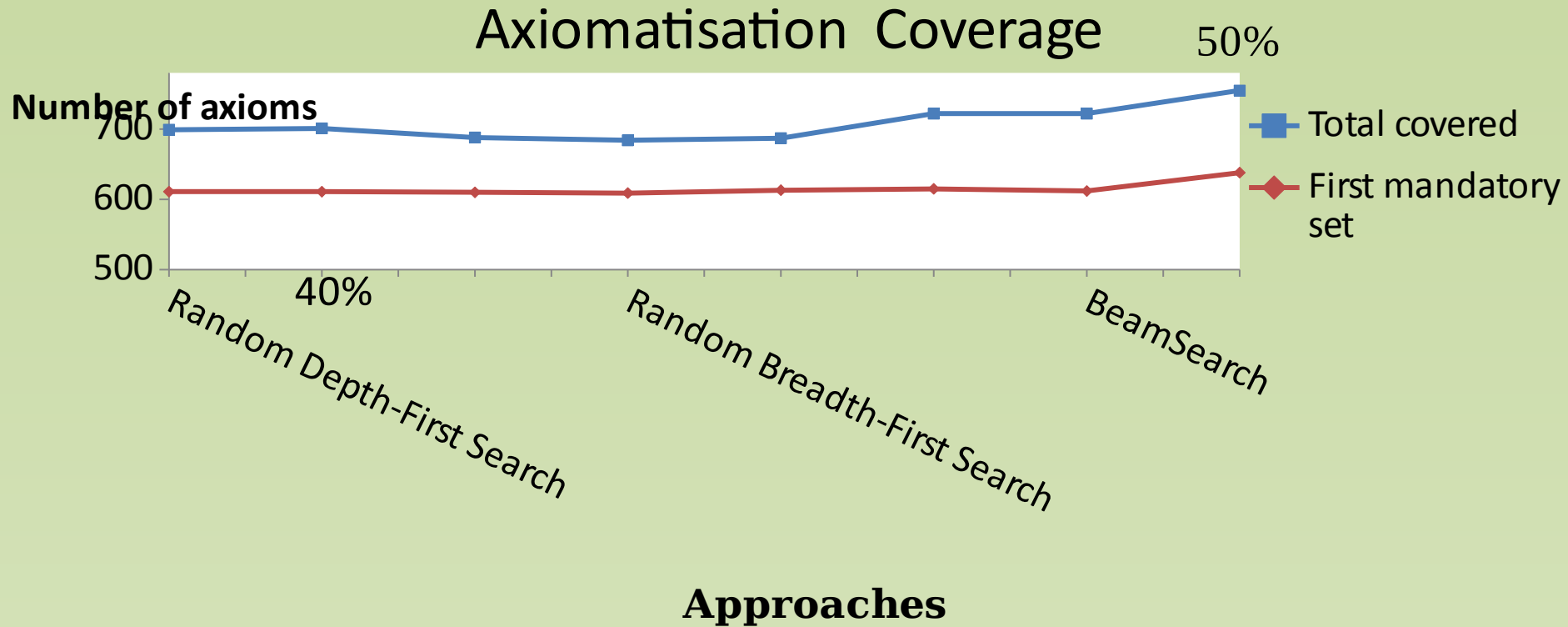
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Experiment Settings

| | Axiomatization Coverage |
|-----------------|--|
| Test Cases | 319 |
| Reduction Phase | Enabled |
| Time Limit | 24 hours per test case |
| Hardware | Intel Xeon E5430 |
| Software | Debian GNU/Linux 5.0.8 Java SE RE 1.7.0 |

Results



Thank You ...

Any Question ...