

Programmatic Semantics

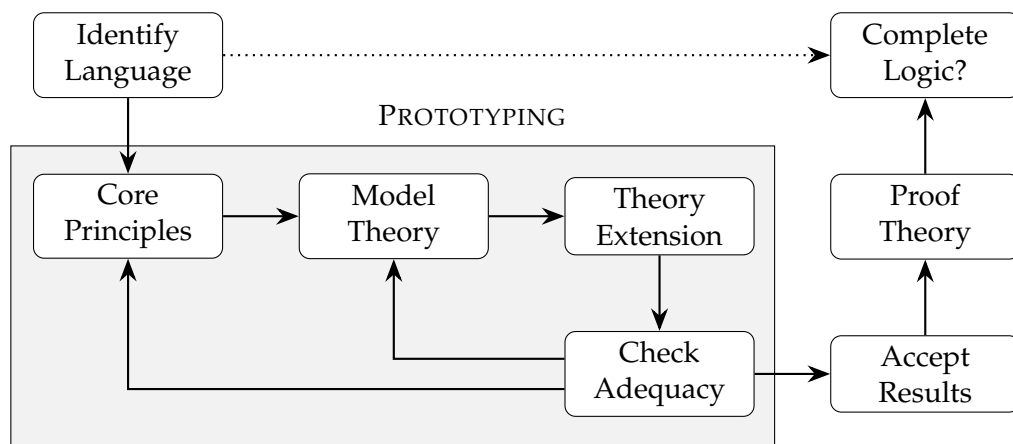
WORK IN PROGRESS, MIT
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Broad Ambitions

Extend the standard methodology in semantics to:

- Reduce cognitive load (avoids running computations by hand)
- Increase accessibility (at the cost of familiarity)
- Support the maturity of the discipline

Standard Methodology



Difficulties

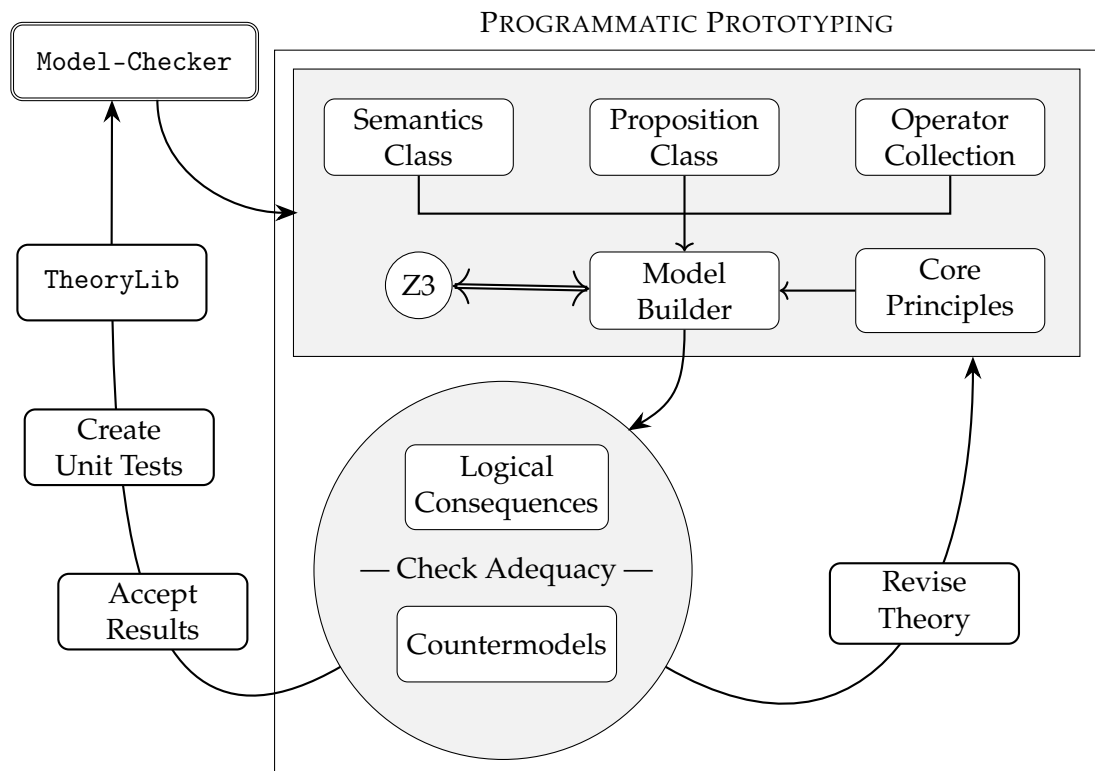
The standard methodology has the following drawbacks:

- Computationally grueling to prototype semantic theories
- Problems of accuracy, redundancy, and memory
- Limits complexity in the development of semantic theories
- Restricts which language fragments can be studied/combined

An Extended Methodology

Humans should not be carrying the computational load.

- SAT solvers, SMT solvers, Z3
- Bitvectors as states
- Truth-conditions as Z3 constraints



Conceptual Engineering Pipeline

This methodology has the following advantages:

- Efficiently prototype new semantic theory
- Modular semantics, theory of propositions, operators
- Evaluate unified languages with many operators
- Compare rival theories over large data sets

Give it a try at: <https://pypi.org/project/model-checker/>