

DEPARTAMENTO DE INFORMÁTICA

Analysable Soft. Lang. Translations

SOFTWARE SYSTEMS / SE.MOVA Team



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Research interests: Software Language Engineering and Model Transformations (specification and validation)

Objectives

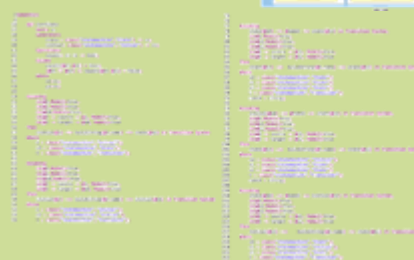
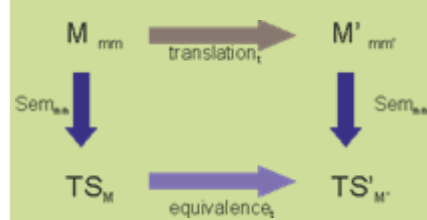
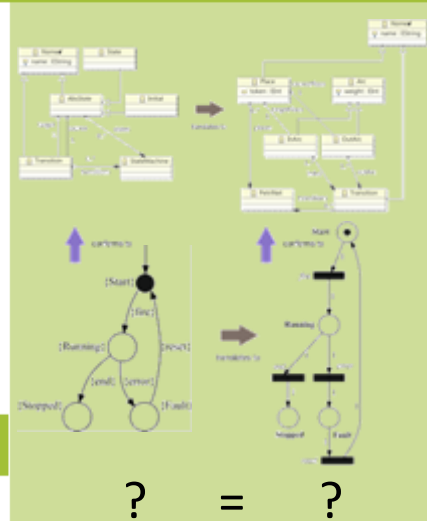
- Study how to design and build adequate software languages to support computational support in specific domains (e.g., Biology, Genetics, Chemistry, Environment, Engineering, etc.)
 - Several kinds of concrete syntax (visual / diagrammatic, textual)
 - Several kinds of formalisms and theories (discrete event systems, statistics, continuous systems)
 - There is a need to interoperate between these formalisms (and supporting software tools): we can do it by means of a translation!
- But, how can we be sure that we correctly implemented a given software language translation (i.e., a compiler)?

Methodology

- Applying a Model Driven Development (MDD) Methodology based on the design and implementation of Specific Modeling Languages tailored to express language's semantics.
- Exploring relevant source and target patterns from an arbitrary translation (with DSLTrans the quantity of these pairs is assured to be finite)
- Explicit operational semantic definitions (in the Figure on the left: Sem_{mm} and $Sem_{mm'}$)
- Checking bisimulation between Transition Systems (TS)
 - still a challenge (dependent on the source language)

Expected Results

- An appropriate language for syntax-to-syntax translations: DSLTrans
 - guarantees termination of any transformation
 - guarantees confluence of the results of any transformation
 - provides a finite symbolic-execution space for any DSLTrans specification
 - provides a transformation engine that is able to execute any DSLTrans specification
- An appropriate language for operational semantics: SOS (by Plotkin)
 - implemented by means of a translation to a prolog implementation of the SOS
 - fixpoint semantics



Funding: