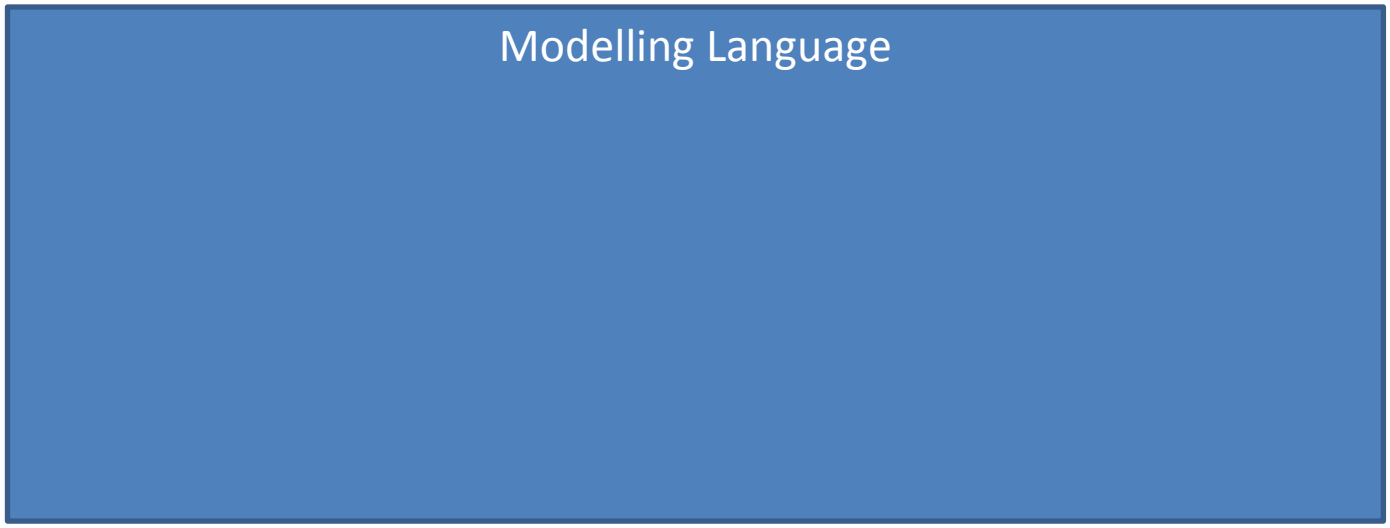
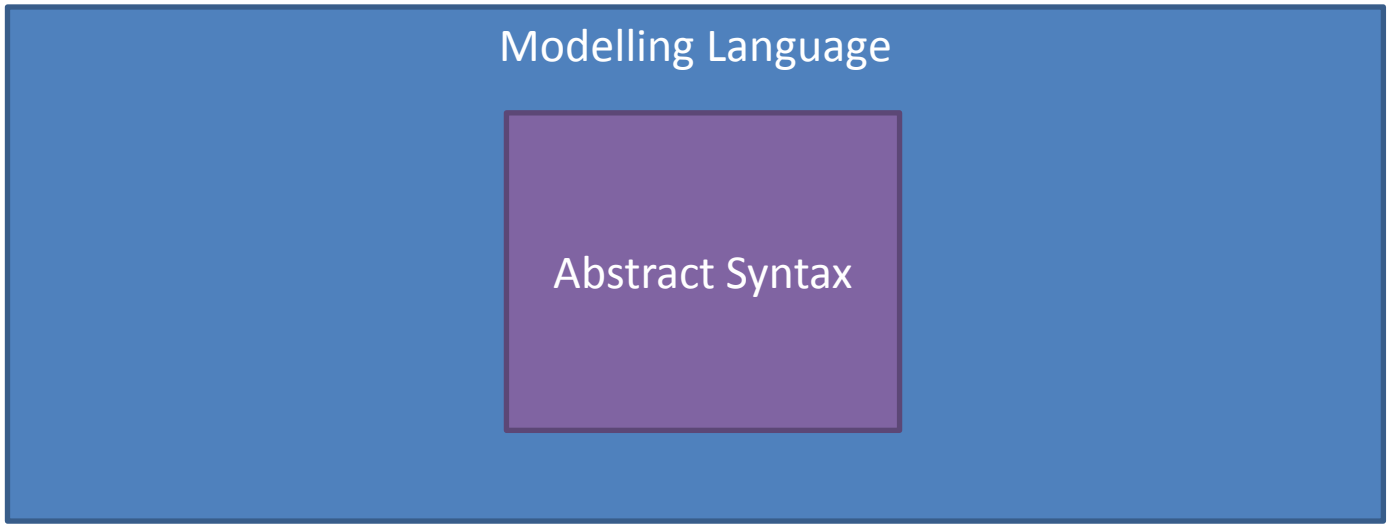
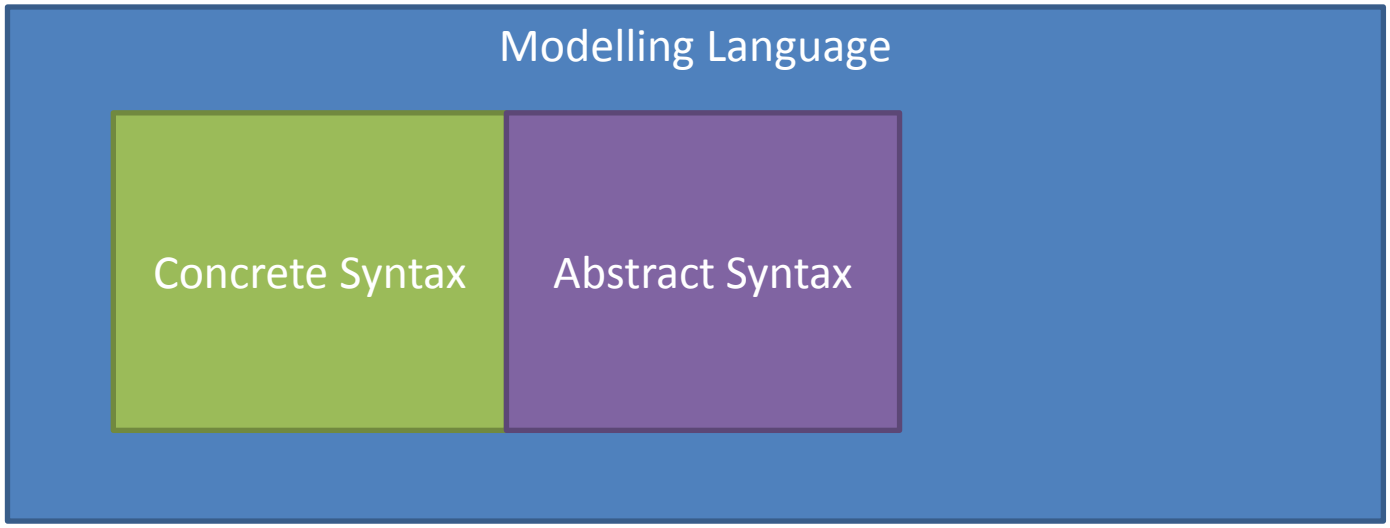
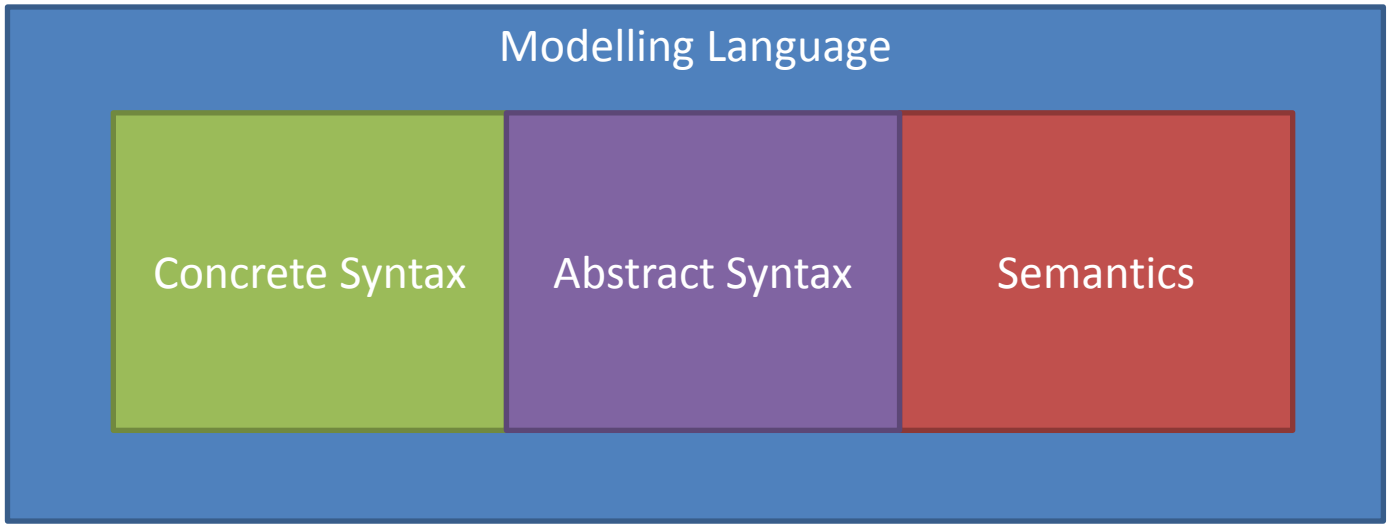
Composing Textual Modelling Languages in Practice

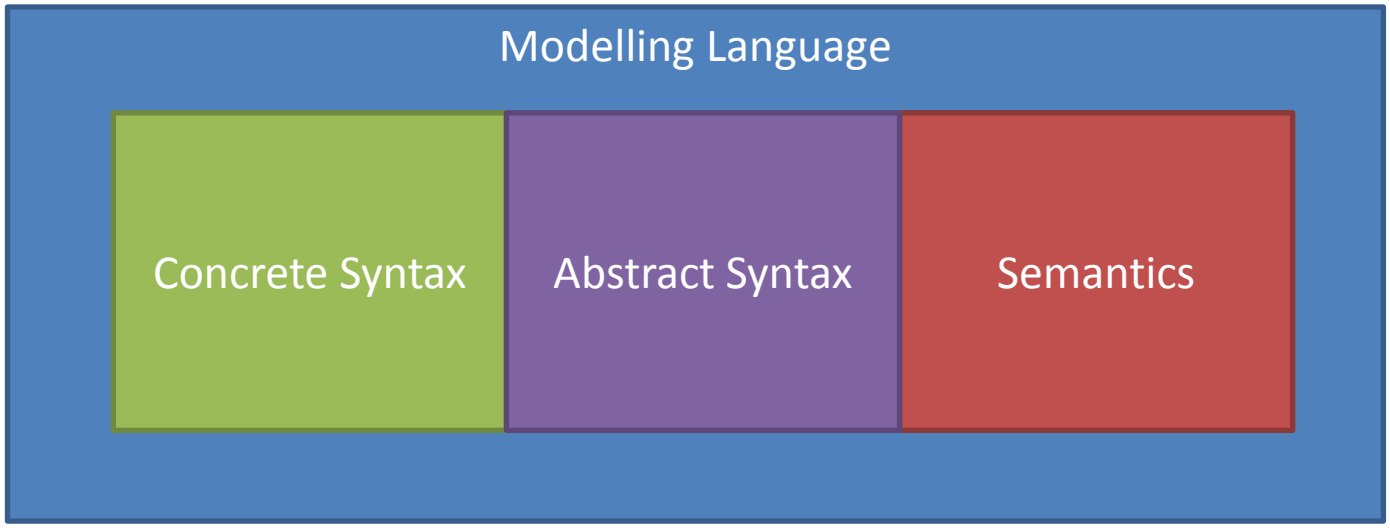
Bart Meyers
Antonio Cicchetti
Esther Guerra
Juan de Lara


Modelling Language

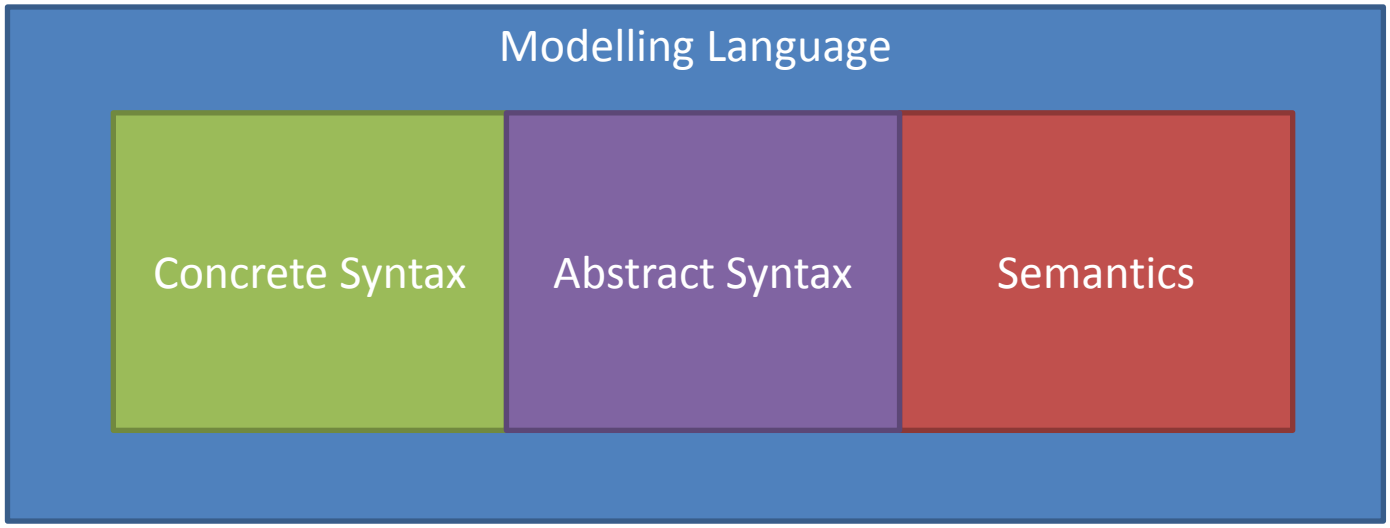

Modelling Language
Abstract Syntax


Modelling Language
Concrete Syntax
Abstract Syntax


Modelling Language
Concrete Syntax
Abstract Syntax
Semantics

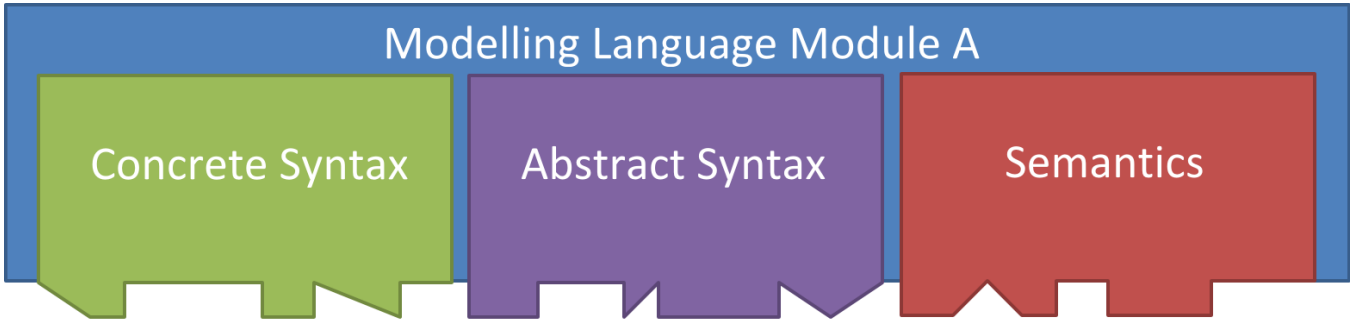

Modelling Language
Concrete Syntax
Abstract Syntax
Semantics

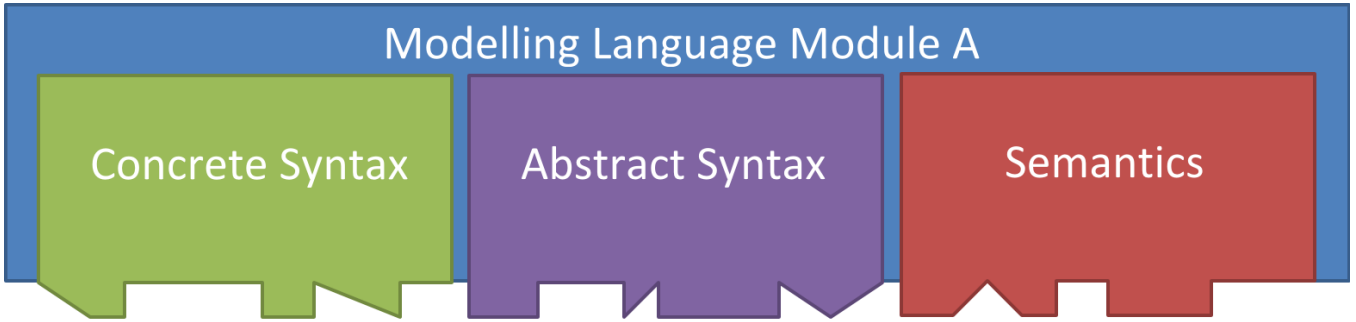
REUSE?



REUSE?

- Variants
- Arithmetics
- Time
- Debugging


Modelling Language Module A
Concrete Syntax
Abstract Syntax
Semantics


Modelling Language Module A
Concrete Syntax
Abstract Syntax
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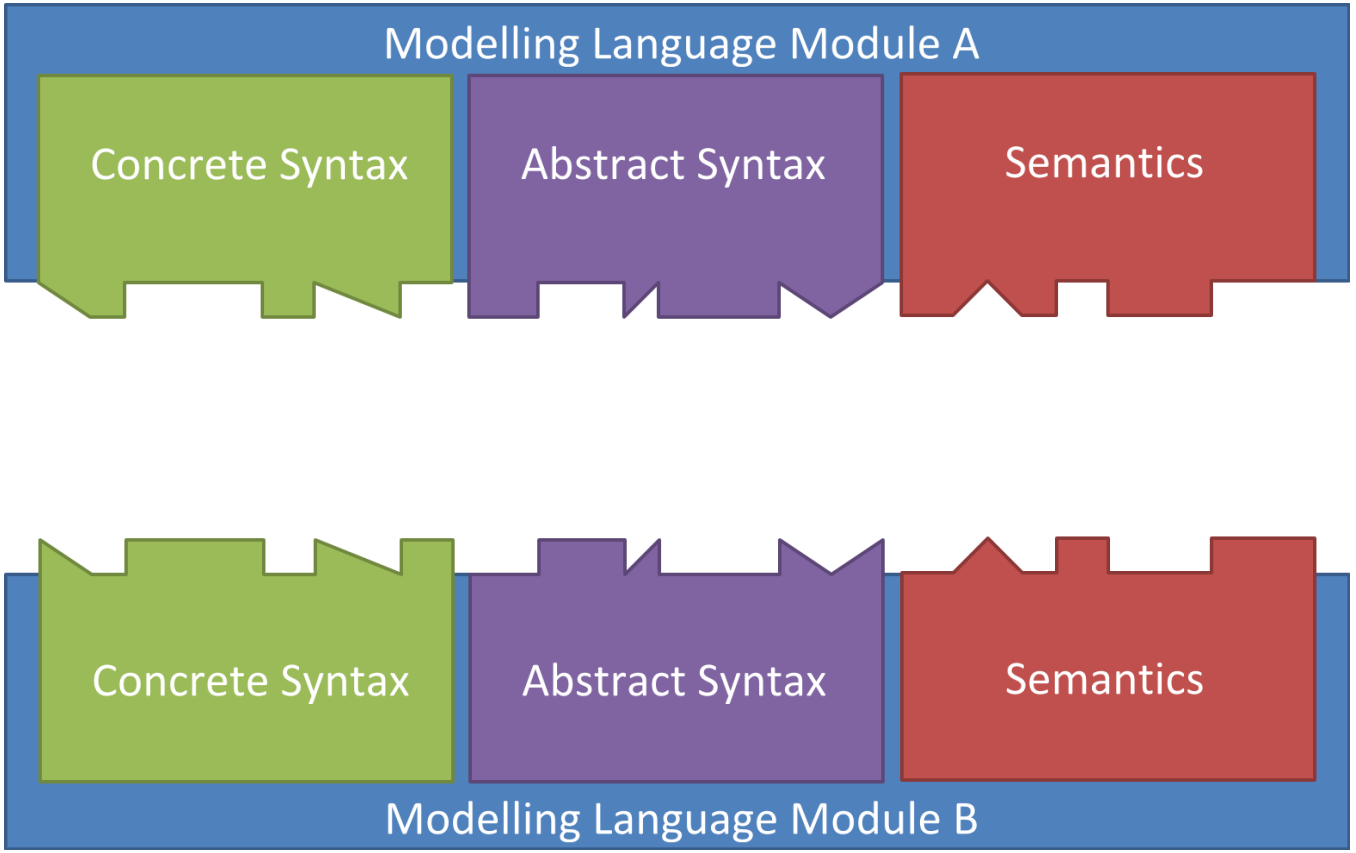
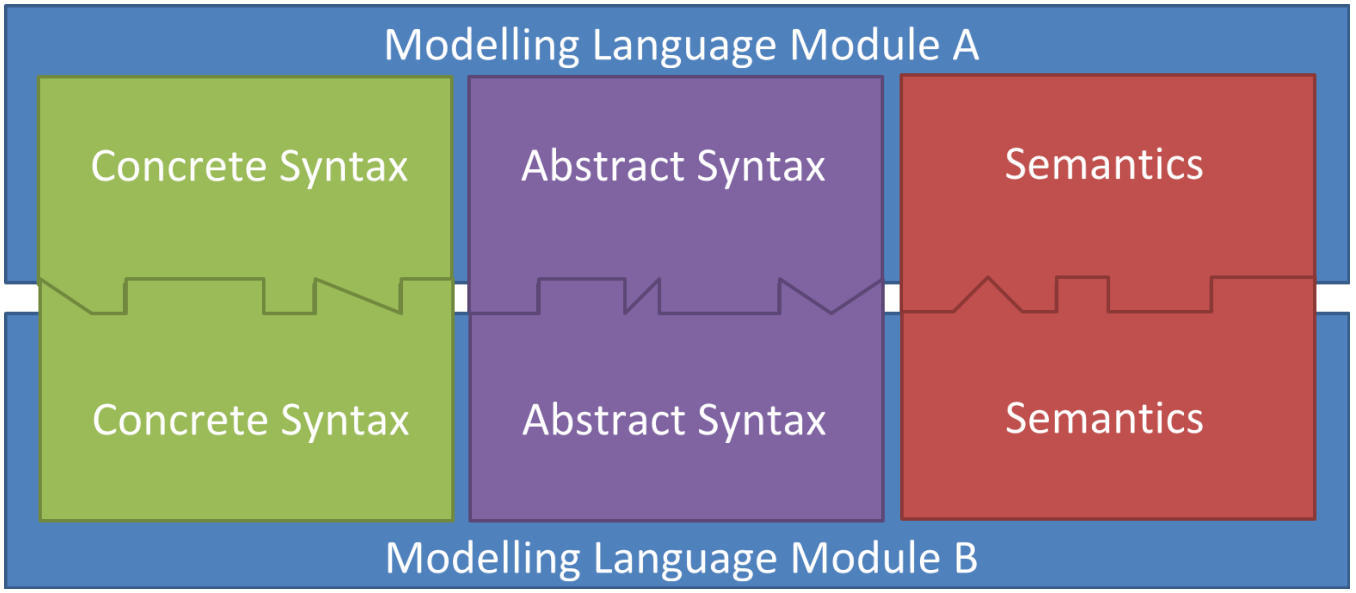
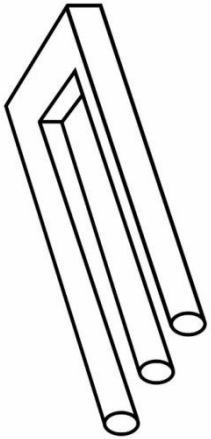
REUSE!


Modelling Language Module A
Concrete Syntax
Abstract Syntax
Semantics
Concrete Syntax
Abstract Syntax
Semantics
Modelling Language Module B



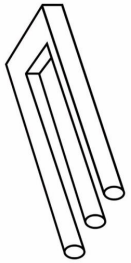
- AOM?
- Weave AS-CS-Sem
- Interface
- cfr. Generic Programming



metaDepth

A framework for deep meta-modelling

J. de Lara and E. Guerra. Deep meta-modelling with MetaDepth. In TOOLS'10, volume 6141 of LNCS, pages 1–20. Springer, 2010.



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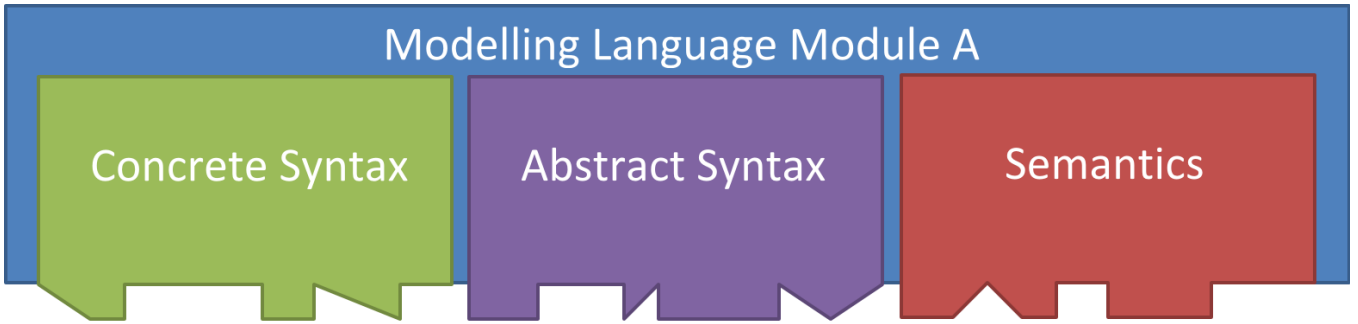

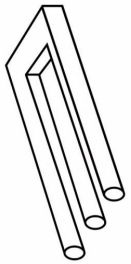

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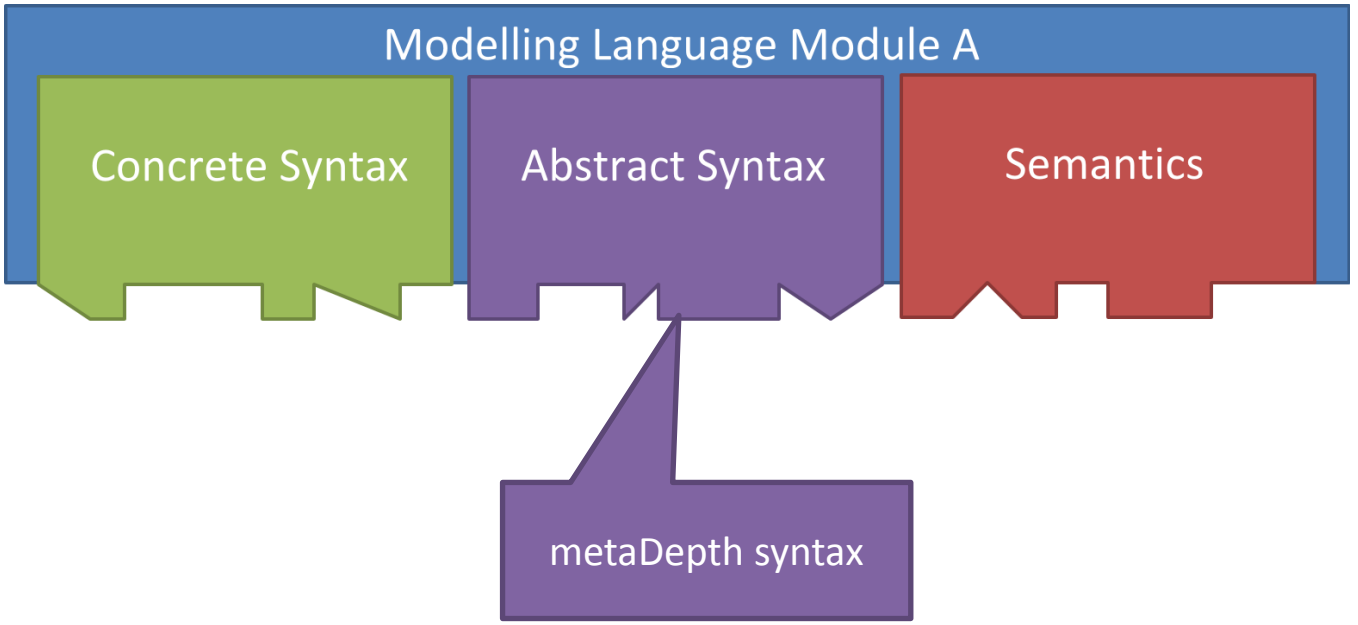

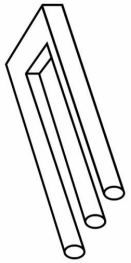

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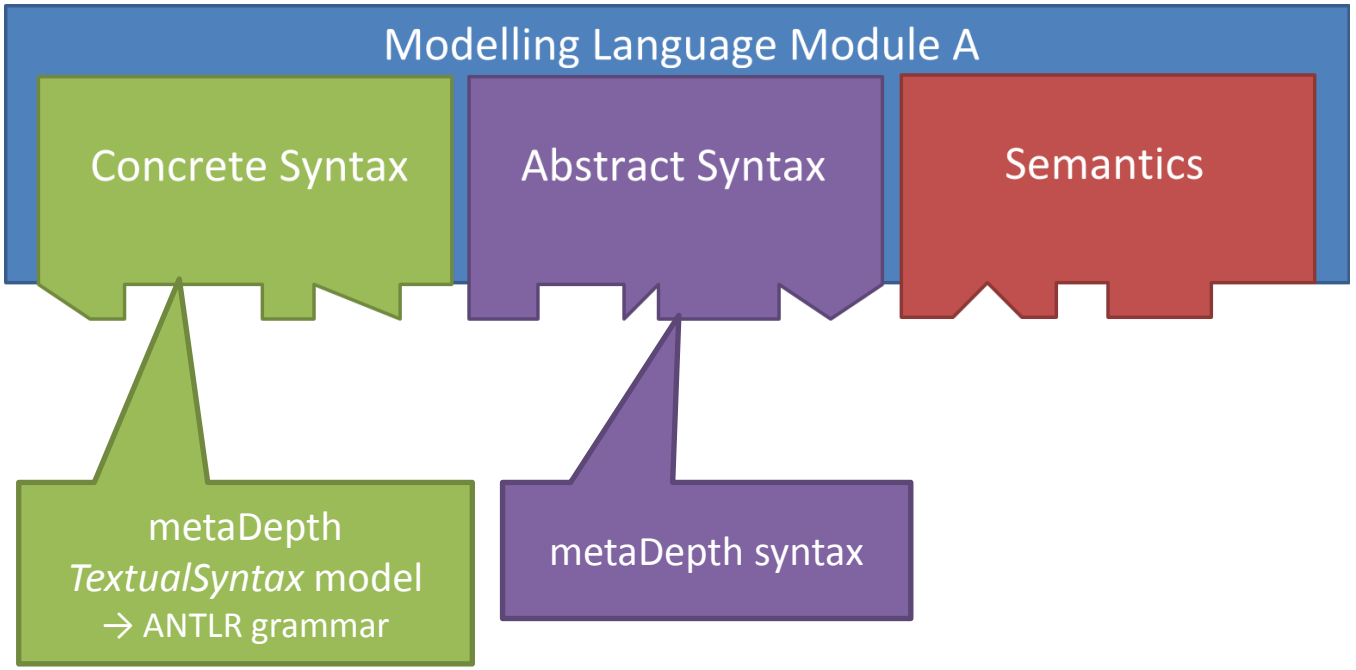

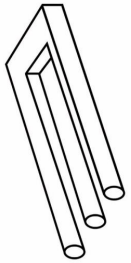

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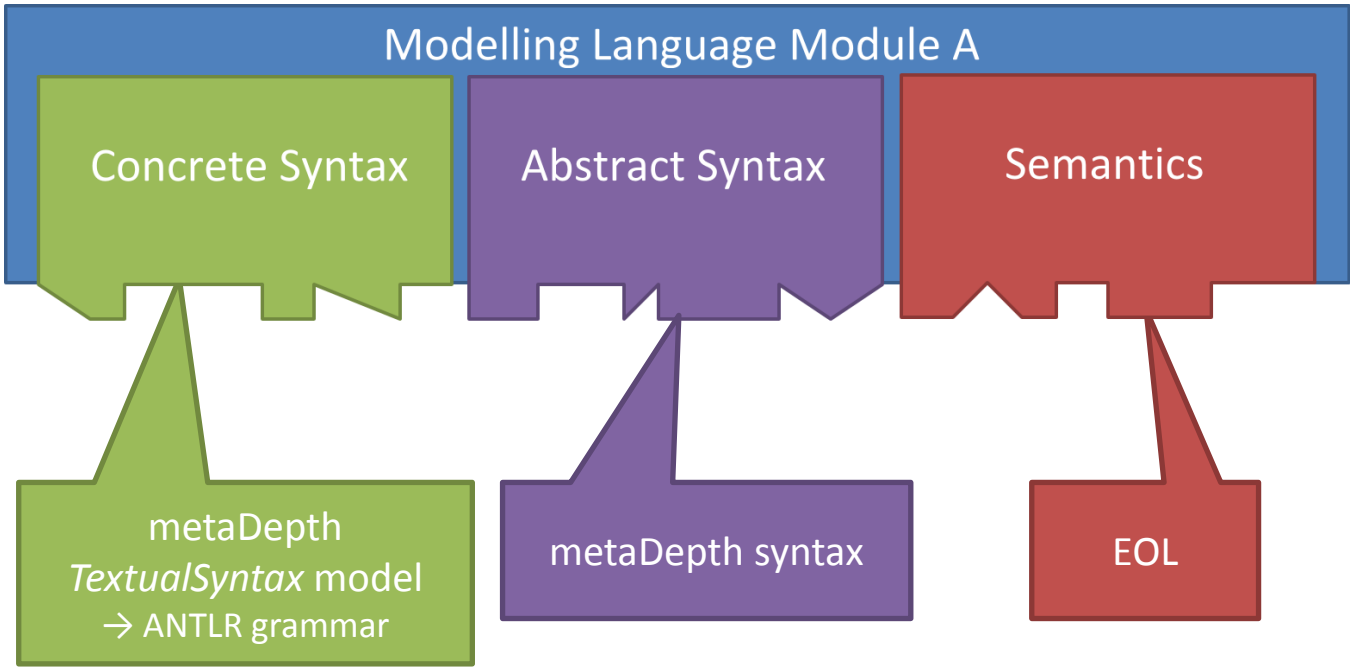
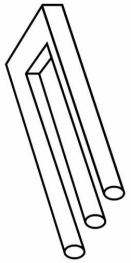




metaDepth

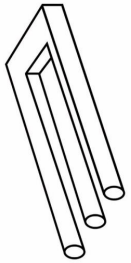
A framework for deep meta-modelling

EXTENSION

TEMPLATES

CONCEPTS

J. de Lara and E. Guerra. From types to type requirements: Genericity for model-driven engineering. Software and System Modeling, in press, 2012



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A framework for deep meta-modelling

EXTENSION

→ modularity

TEMPLATES

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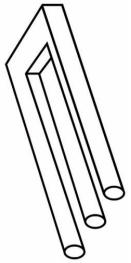

metaDepth

A framework for deep meta-modelling

EXTENSION

→ modularity

TEMPLATES

→ reusability

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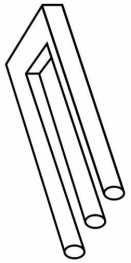

metaDepth

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EXTENSION

→ modularity

TEMPLATES

→ reusability

CONCEPTS

→ requirements

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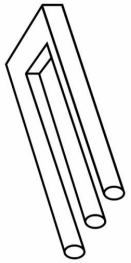

metaDepth

A framework for deep meta-modelling

EXTENSION

→ modularity

TEMPLATES

→ reusability

CONCEPTS

→ requirements

BINDING

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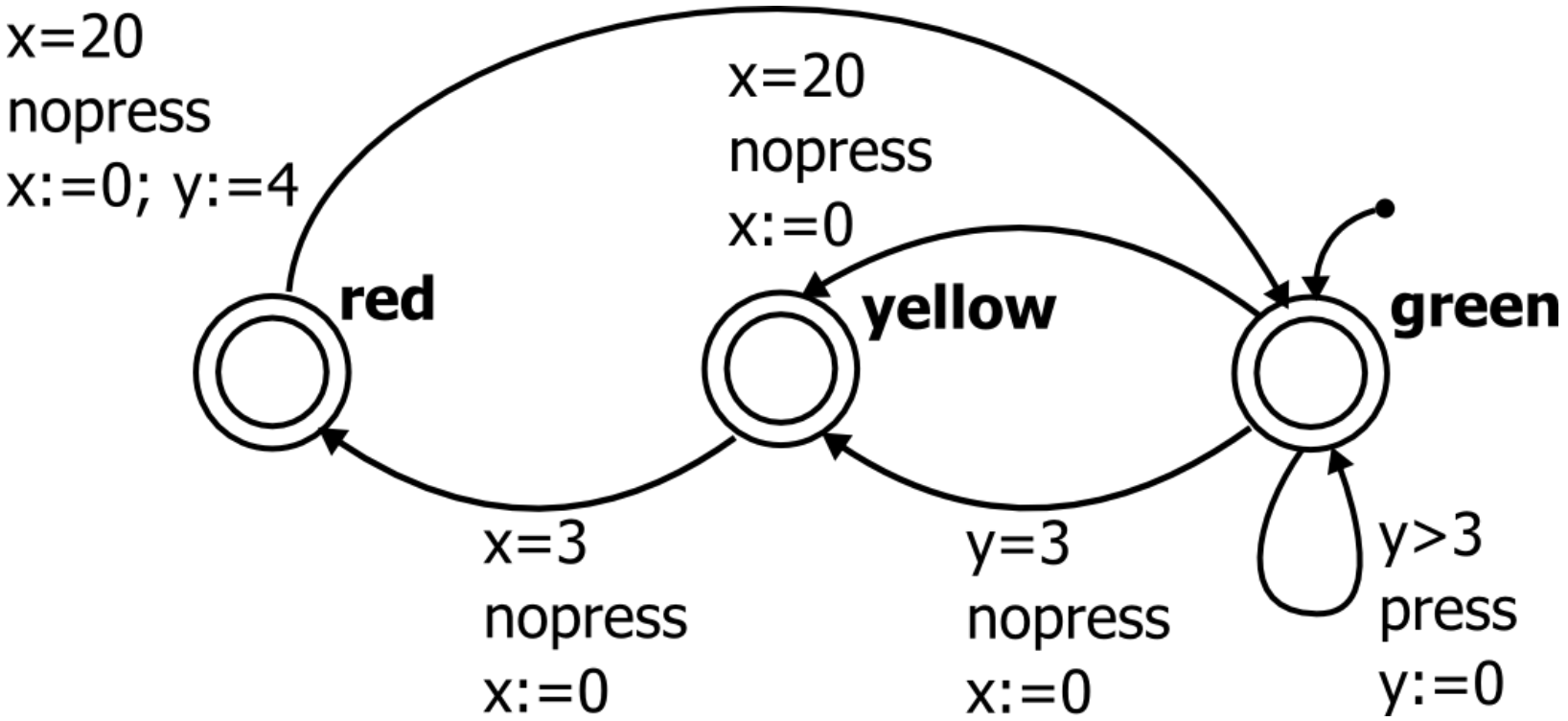
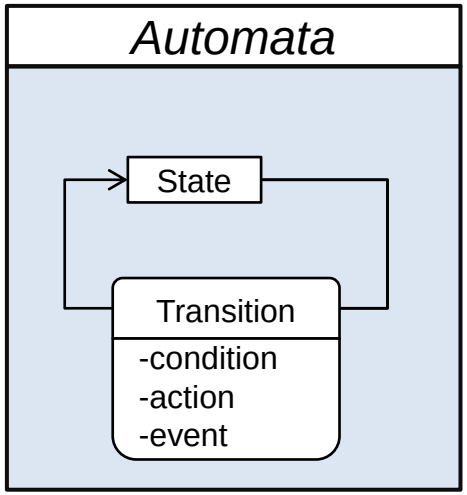
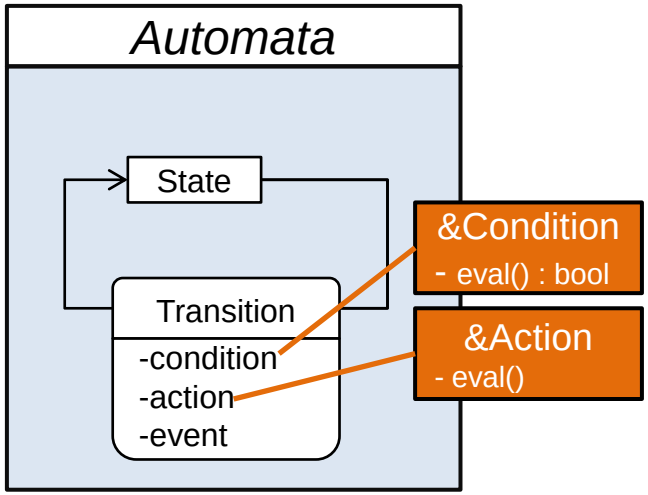


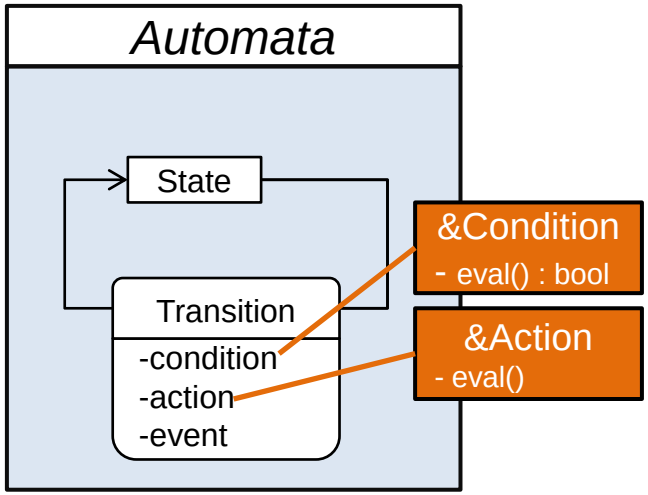
Rajeev Alur and David L. Dill. 1994. A theory of timed automata. *Theor. Comput. Sci.* 126, 2 (April 1994), 183-235.

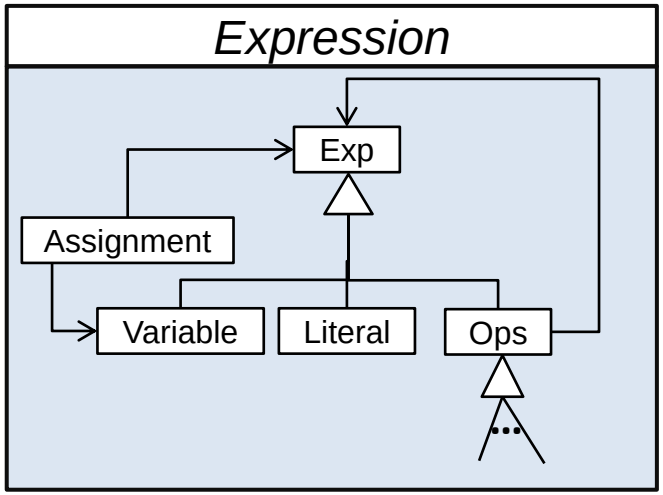

Automata
State
Transition
-condition
-action
-event

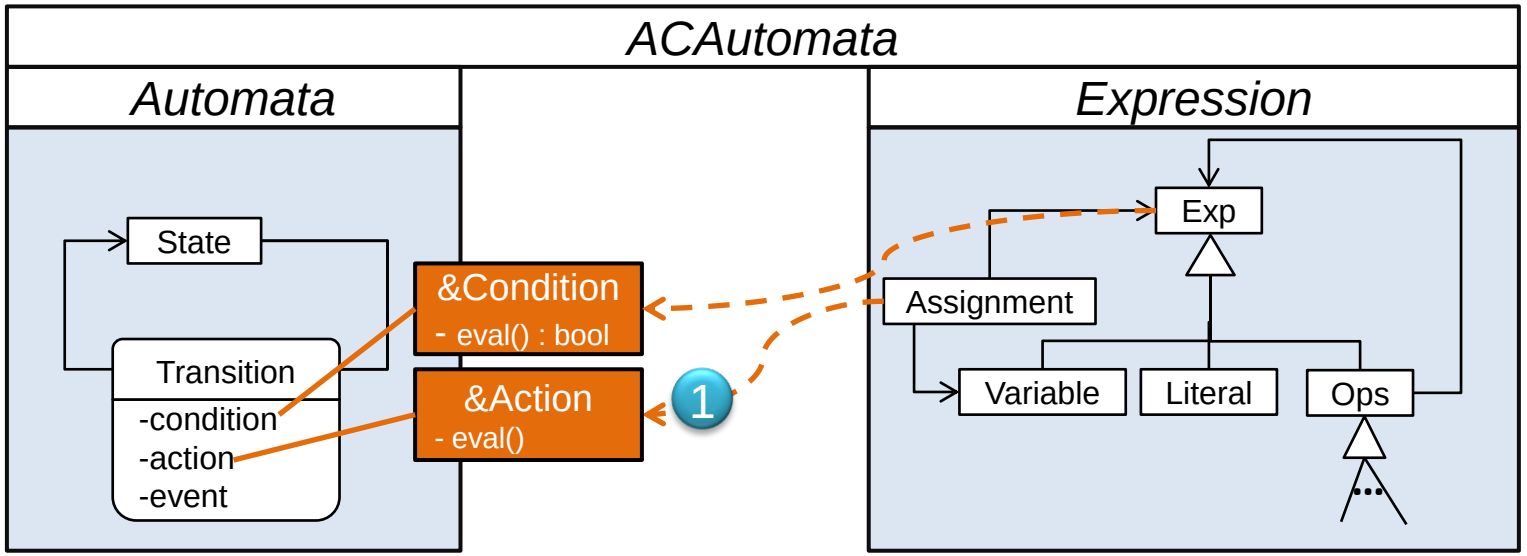


TEMPLATE

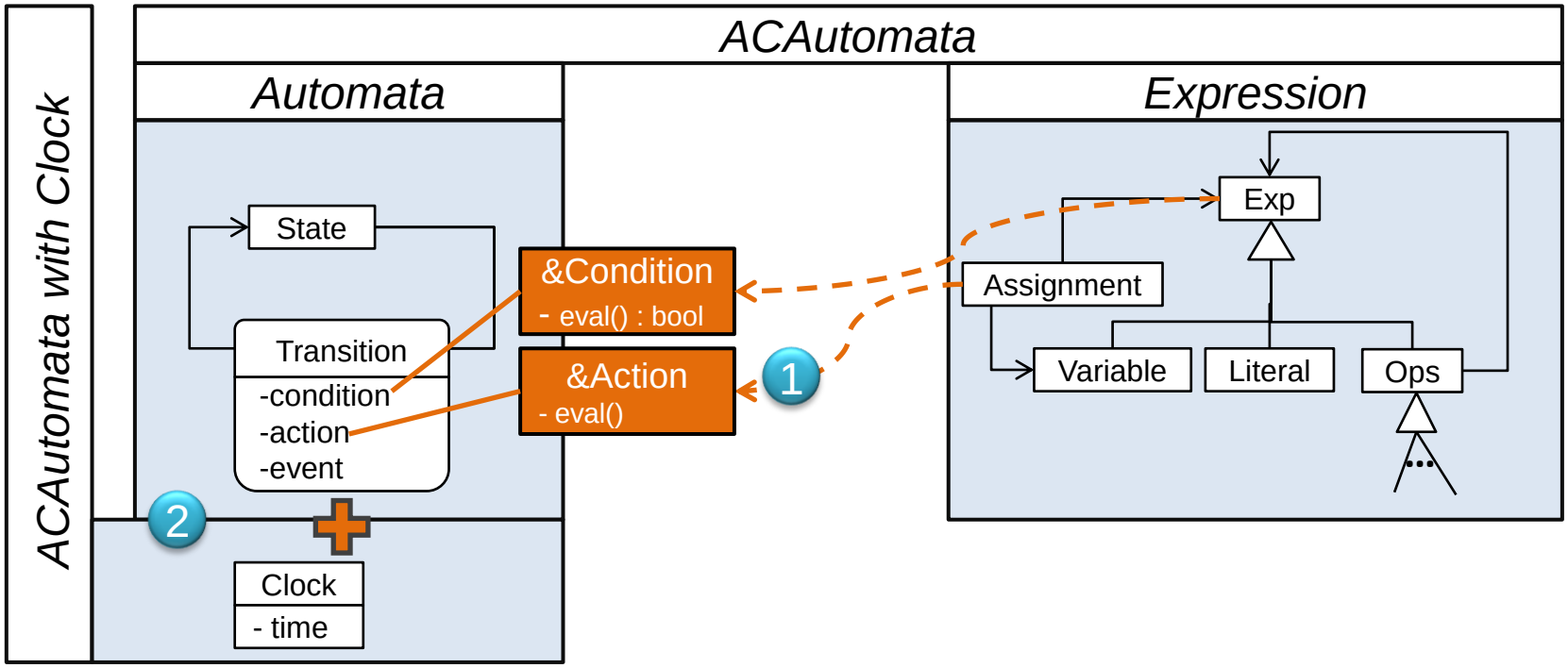
CONCEPT


Automata
State
Transition
-condition
-action
-event
&Condition
- eval() : bool
&Action
- eval()


Expression
Exp
Assignment
Variable
Literal
Ops


ACAutomata
Automata
Expression
State
Transition
-condition
-action
-event
&Condition
- eval() : bool
&Action
- eval()
1
Exp
Assignment
Variable
Literal
Ops

BINDING

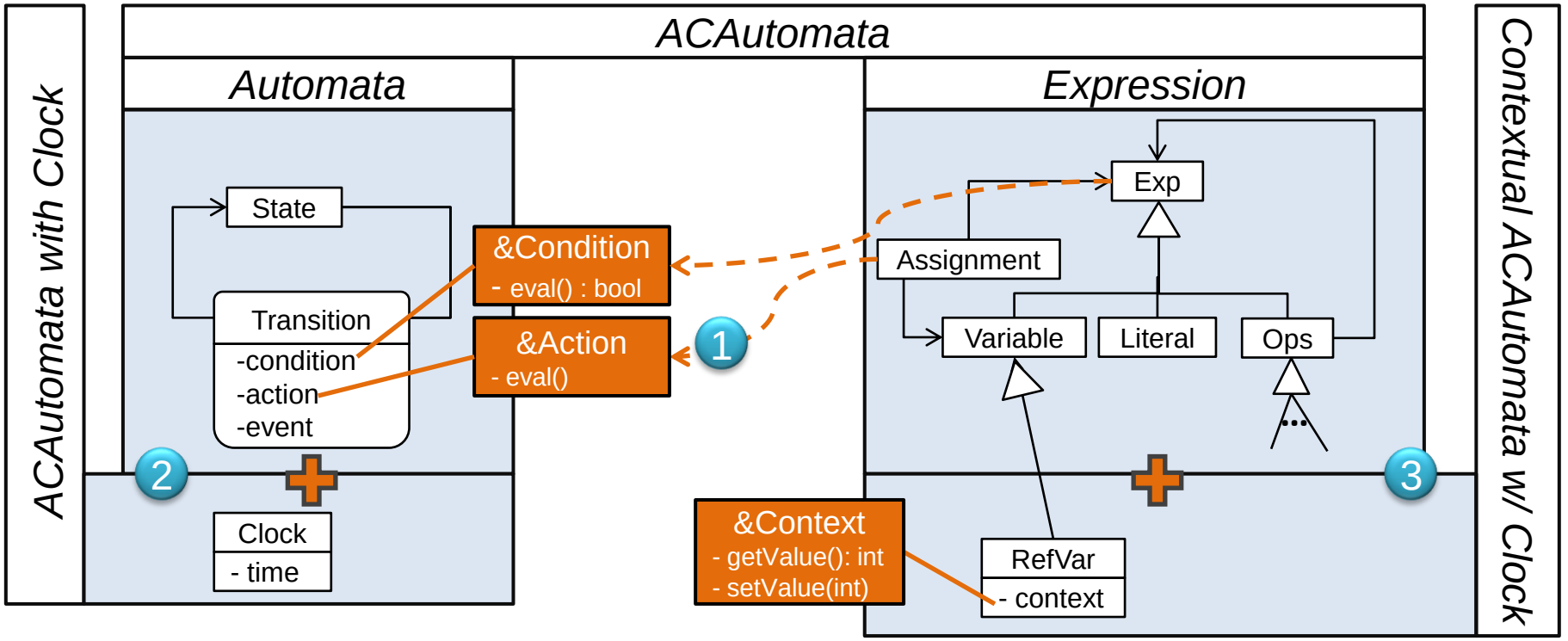


EXTENSION

TEMPLATE

CONCEPT

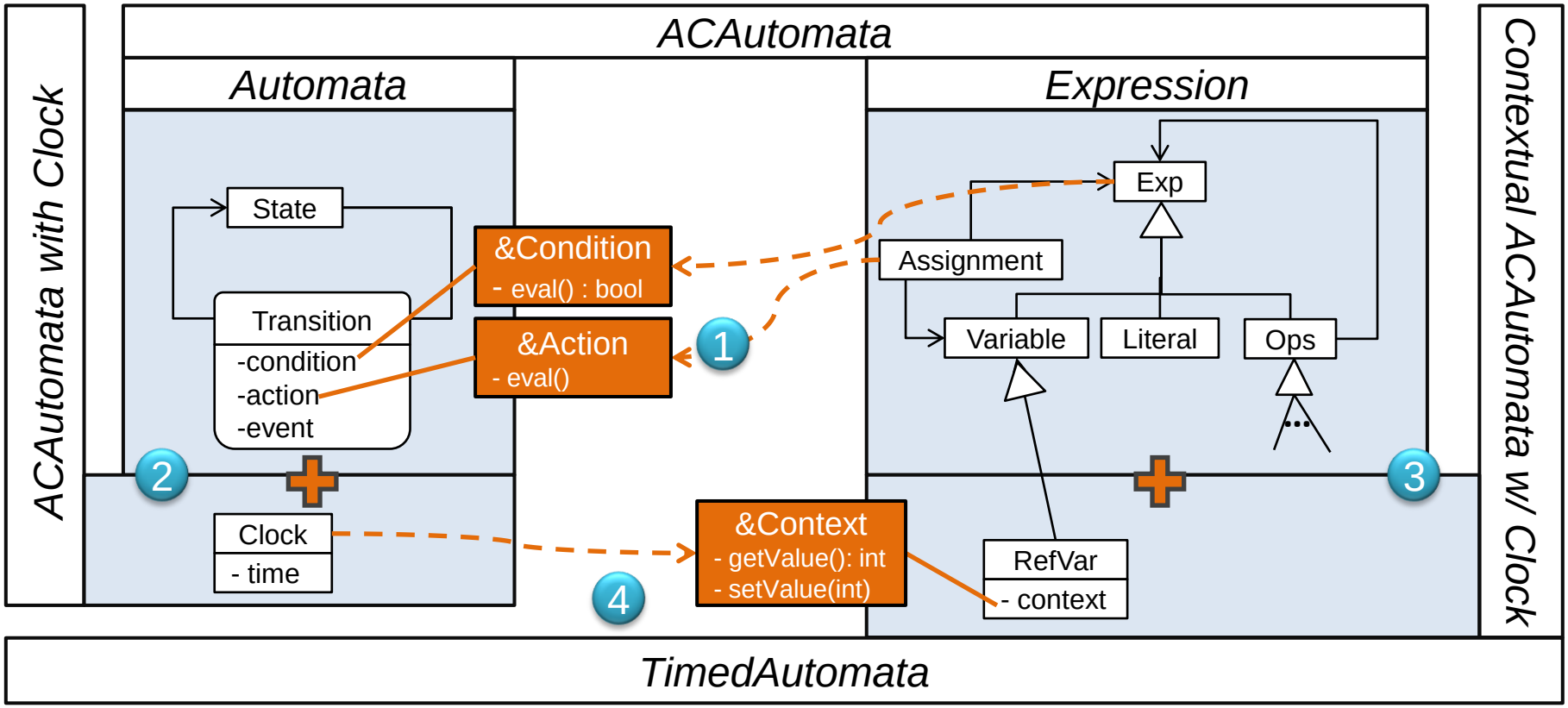
BINDING



EXTENSION

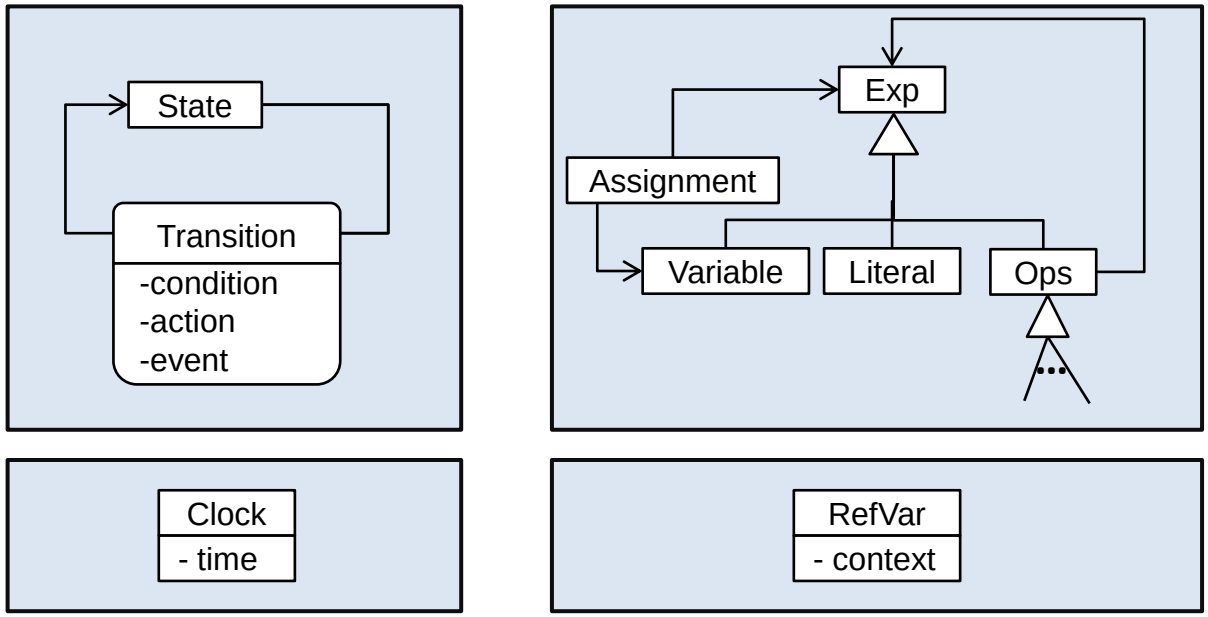
TEMPLATE

CONCEPT


ACAutomata with Clock
ACAutomata
Automata
Expression
Contextual ACAutomata w/ Clock
State
Transition
-condition
-action
-event
&Condition
- eval() : bool
&Action
- eval()
Exp
Assignment
Variable
Literal
Ops
1
2
3
4
Clock
- time
&Context
- getValue(): int
- setValue(int)
RefVar
- context
TimedAutomata

BINDING

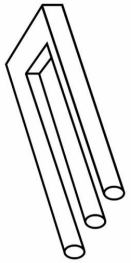
Conclusions



- Composition of *TimedAutomata*
  - **AS CS Sem**
  - Modular
  - Generic

REUSE!

Bart.Meyers@ua.ac.be



metaDepth

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EXTENSION

- Inheritance (meta) AS
- Inheritance (instance) CS
- extends AS CS
- imports AS CS

→ modularity

TEMPLATES

- Template AS CS
- Operation Template Sem

→ reusability

CONCEPTS

- Structural concept AS CS
- Hybrid concept Sem
- Binding AS CS Sem

→ requirements

J. de Lara and E. Guerra. From types to type requirements: Genericity for model-driven engineering. Software and System Modeling, in press, 2012