

Improving the Definition of UML

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Outline

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I will argue that

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- the current definition does not achieve them
- mathematics is
 - unavoidable for precision
 - compatible with understandability

and I will survey some relevant work

Criteria for a good definition of UML

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Criterion 0 it must define UML

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Criterion 1 it must define UML

Criteria for a good definition of UML

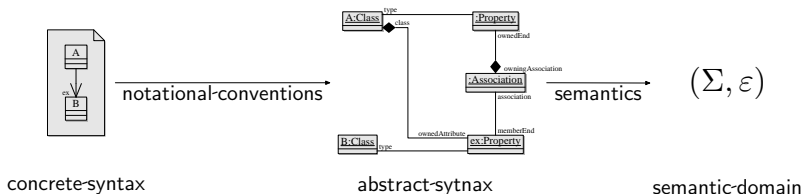
Criterion 0 it must define UML

Criterion 1 it must define UML (5 things to define)

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Criteria: semantic applications, agreement

Criterion 2 automatic checking of semantic properties like

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Criterion 3 enables **agreement** on complex ideas



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real agreement requires understanding

- of the models
- hence, of the language

Criteria: reflection and flexibility

Criterion 4 reflective

Criteria: reflection and flexibility

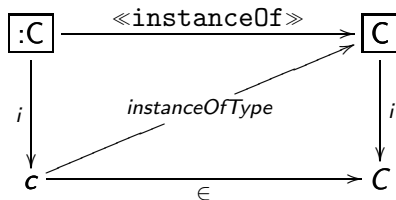
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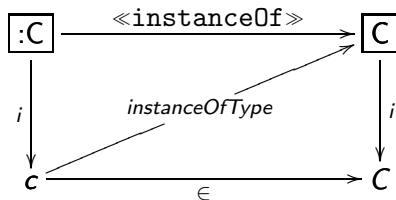
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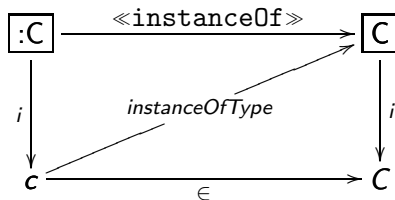


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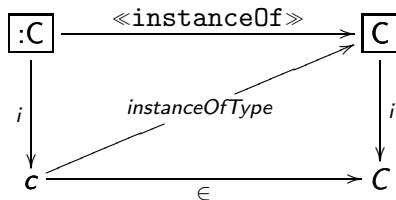
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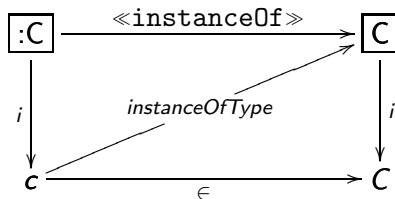
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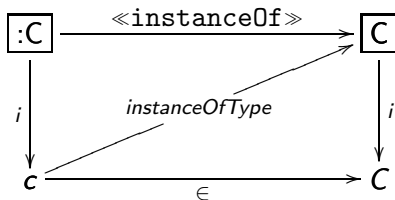
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Criterion 5 flexible, to cater for

- semantic variation points
- profiles
- DSL's interoperable with UML
- later versions of UML

Criteria Summary

We want a **precise**, yet **understandable** definition of UML.

Evaluation of the Current Definition of UML

- no agreement on meaning of UML models



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 - claims in the literature



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- it is not easy, we should ask the experts
 - precision: mathematics
 - understanding: cognitive psychology

Survey: Z and Algebra

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Algebraic Specification

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Algebraic Specification

- Reggio et al 2001, seek semantics for whole language, advocate models as axioms, recognise need for temporal operators

Survey: Logic and OCL

Translating OCL to Logic

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- O’Keefe 2006, small UML subset with sequence diagrams translated to DL for satisfiability checking

Survey: Graphs and STS

Symbolic Transition Systems

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- a system state is an object diagram = a graph
- evolution defined by graph transformation rules (perhaps given as UML interaction diagrams)

Conclusions

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- a new logic with graphs as static statements,
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**we must gain precision and understandability,
otherwise model driven development will fail**