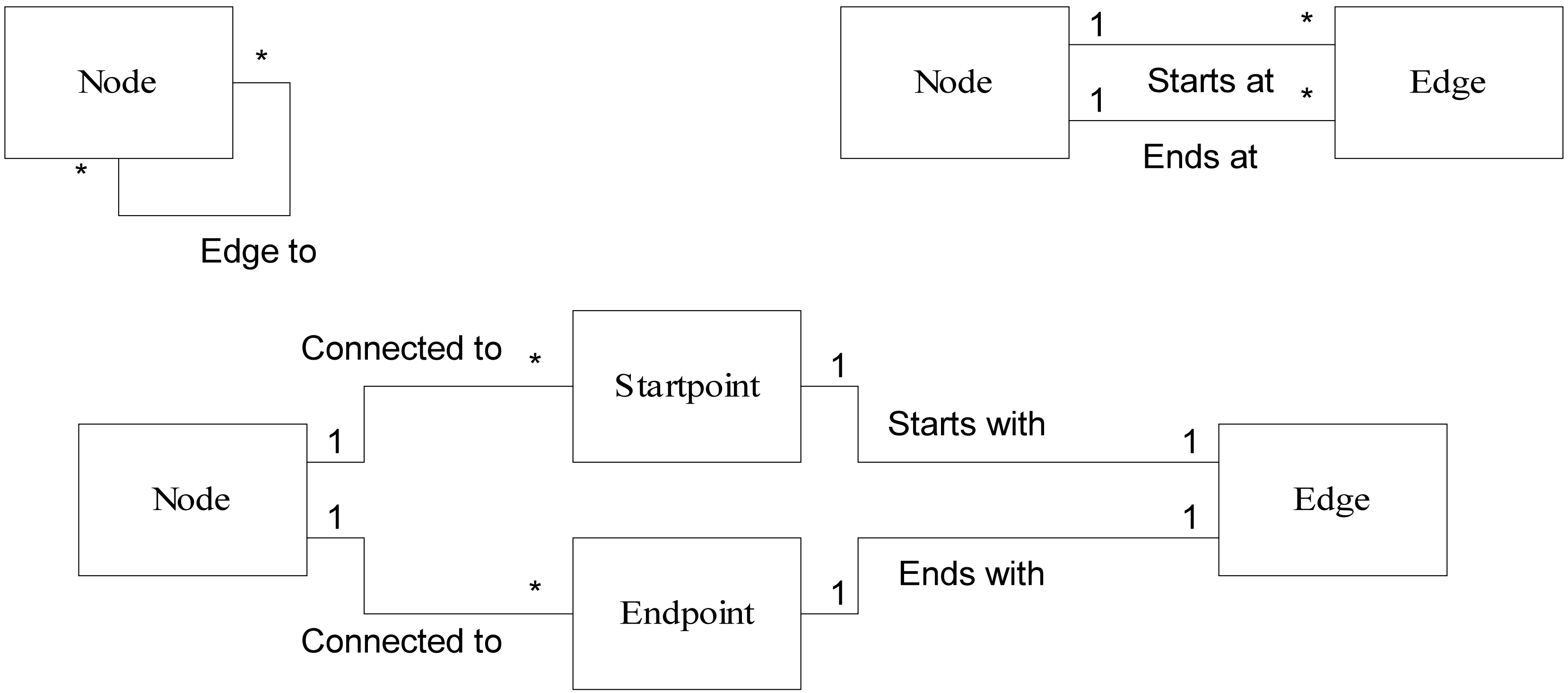
Equivalence problem of UML composites

Girts Linde
University of Latvia
glinde@acm.org

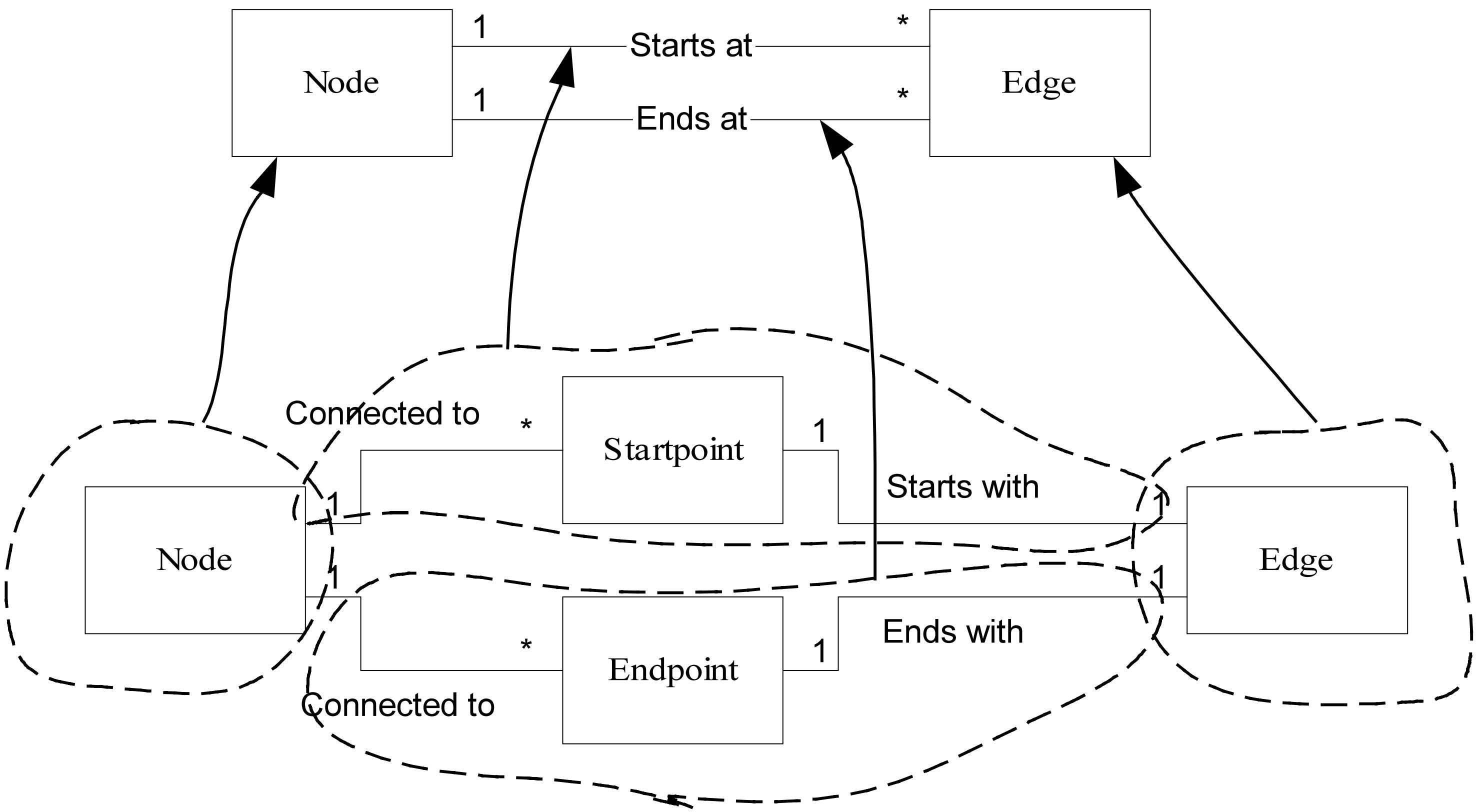
Plan of presentation

- Context - intuitive equivalence of class diagrams
- Problem - equivalence of UML composites
- Solution - canonization of class diagrams

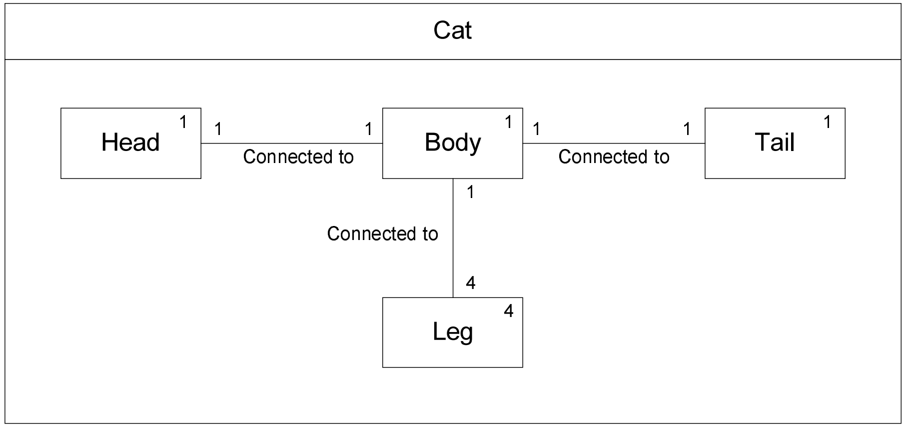
Intuitive Equivalence

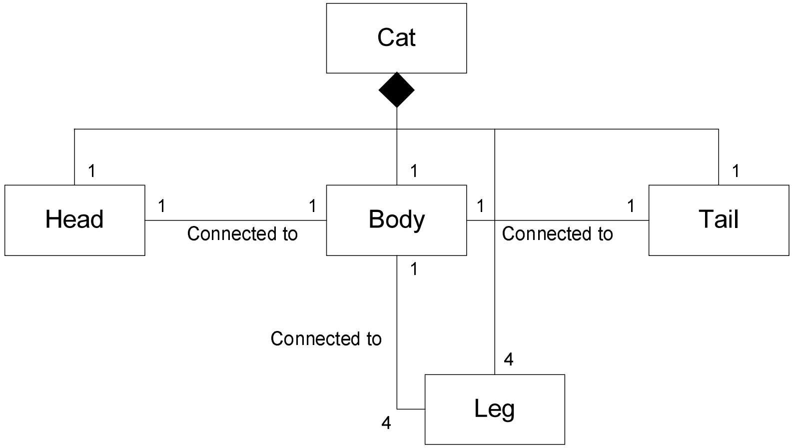


Definition of new concepts



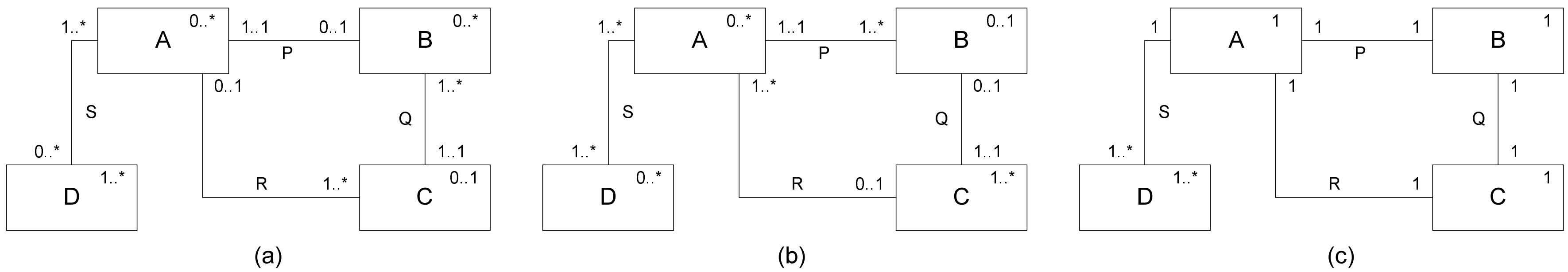
UML composites





Equivalence of Composites

- Two composite class diagrams are equivalent if they describe the same set of instance diagrams



The Language Restriction

Working subset of class diagram language:

- classes with multiplicity
- binary associations
- four multiplicity intervals

  1..1   0..1   1..*   0..*

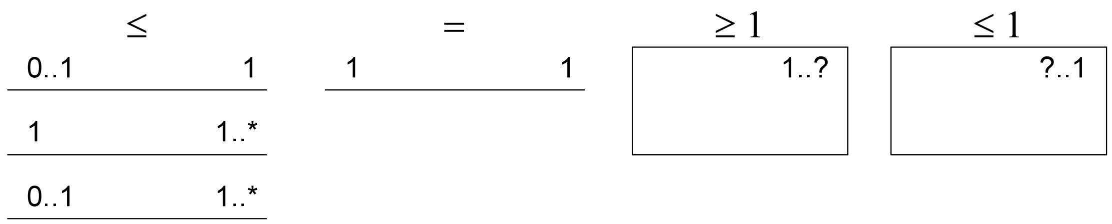
The Main Result

A theorem is proven:

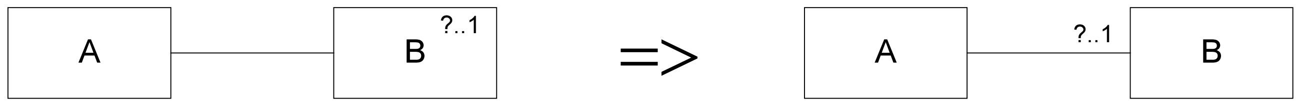
- There exists an algorithm that solves the equivalence problem for composite class diagrams

Canonization Rules

- System of inequalities

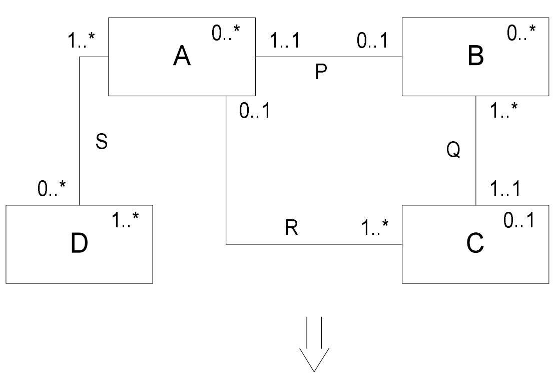


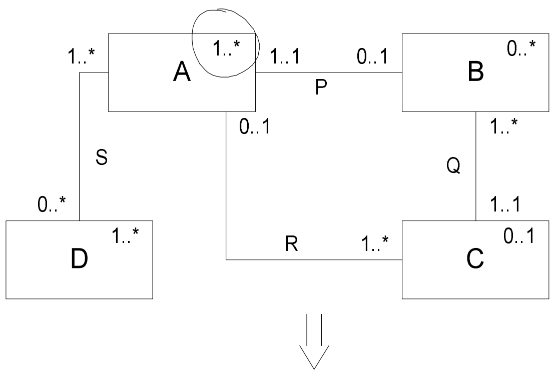
- 4 local transformation rules



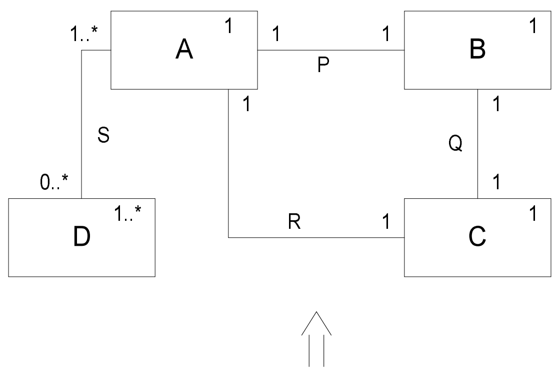
. . .

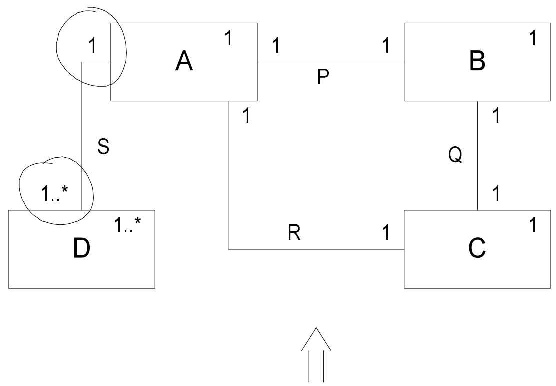
Example of Canonization





$$\begin{cases} a \geq 1 \\ a \geq b, b \geq c, c \geq a \\ c \leq 1 \end{cases} \quad \Rightarrow \quad a = b = c = 1$$





Equivalence of Composites