Mathematical Logics
Description Logic: Tbox and Abox

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Abox - Syntax

The 2nd component of a KB is the world description, the ABox.

An ABox is about individuals, which have names, and one *asserts* properties about them. We denote individual names as a, b, c,…

An assertion with concept C is called concept assertion (or simply assertion) in the form:

$$C(a), C(b), C(c), \ldots$$

An assertion with Role R is called role assertion (or simply assertion) in the form:

$$R(a,b), R(b,c), R(c,c), \ldots$$

Student(Paul)
Professor(Fausto)
Friend (Fausto, Paul)

To be read:
Paul belongs to (is in) Student, Fausto belongs to (is in) Professor, Fausto is a friend of Paul

Abox - Semantics

We give semantics to ABoxes by extending interpretations to individual names

An interpretation I: L $\rightarrow \Delta^I$ not only maps atomic concepts to sets, but it also maps each individual name a to an element $a^I \in \Delta^I$, namely

$$I(a) = a^I \in \Delta^I$$

Unique name assumption (UNA). We assume that distinct individual names denote distinct objects in the domain

NOTE: Δ^I is the domain of interpretation, a denotes the symbol used for the individual (the name), while a^I is the actual individual in the domain of interpretation

Abox – Semantics (example)

Δ^I = {Fausto, Jack, Paul, Mary}

Student(Jack)
Student(Mary)
Student(Paul)
Professor(Fausto)
Friend (Fausto, Paul)

We mean that:

I(Jack) = Jack
I(Mary) = Mary
I(paul) = Paul
I(fausto) = Fausto
I(paul) ∈ I(Student)
I(fausto) ∈ I(Professor)
I (Professor) = {Fausto}
I (Student) = {Jack, Paul, Mary, …}
I (Friend) = {<Fausto, Paul,>, …}

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