Applications of Description Logics

Application Areas I

Application Areas I

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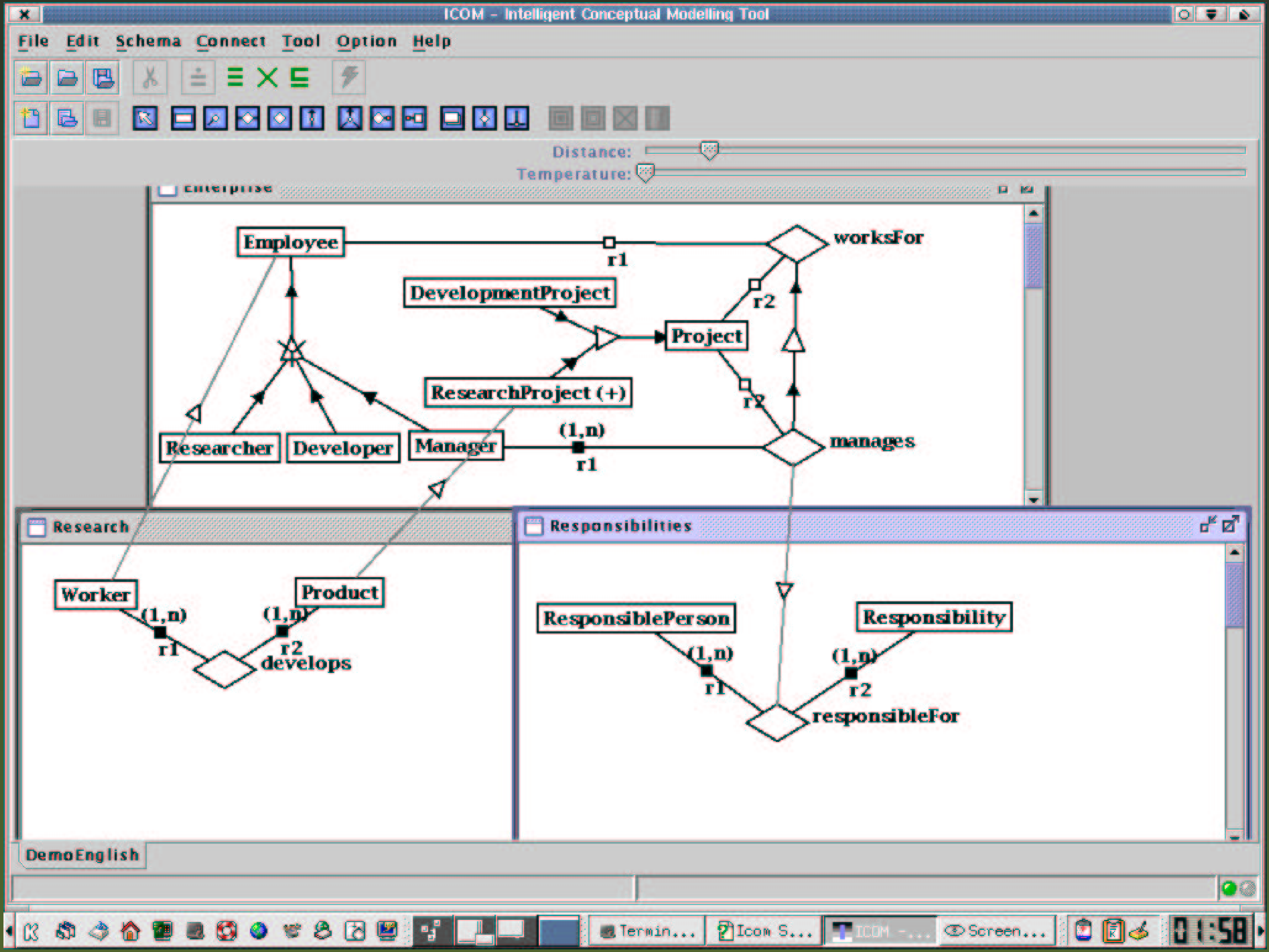
  - Uses FaCT system to provide reasoning support for EER

I.COM Demo


ICOM - Intelligent Conceptual Modelling Tool
File Edit Schema Connect Tool Option Help
Distance:
Temperature:
Enterprise
Employee
r1
worksFor
r2
DevelopmentProject
Project
ResearchProject (+)
r2
Researcher
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(1,n)
r1
manages
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Product
(1,n)
(1,n)
r1
r2
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Responsibility
(1,n)
(1,n)
r1
r2
responsibleFor
DemoEnglish
Termin...
Icon S...
ICOM -...
Screen...
01:58

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  $\text{Stomach-Ulcer} \sqsubseteq \exists\text{hasLocation.Lining-Of-Stomach}$

  $\Rightarrow \text{Ulcer} \sqcap \exists\text{hasLocation.Stomach} \sqsubseteq \text{OrganLiningLesion}$

- ☞ Inverse roles capture e.g. causes/causedBy relationship

  $\text{Death} \sqcap \exists\text{causedBy.Smoking} \sqsubseteq \text{PrematureDeath}$

  $\Rightarrow \text{Smoking} \sqsubseteq \text{CauseOfPrematureDeath}$

- ☞ Cardinality restrictions add consistency constraints

DAML+OIL Medical Terminology Examples

E.g., DAML+OIL medical terminology ontology

- ☞ Transitive roles capture transitive partonomy, causality, etc.

  $\mathsf{Smoking} \sqsubseteq \exists\mathsf{causes.Cancer}$ plus $\mathsf{Cancer} \sqsubseteq \exists\mathsf{causes.Death}$

  $\Rightarrow \mathsf{Cancer} \sqsubseteq \mathsf{FatalThing}$

- ☞ GCIs represent additional non-definitional knowledge

  $\mathsf{Stomach\text{-}Ulcer} \doteq \mathsf{Ulcer} \sqcap \exists\mathsf{hasLocation.Stomach}$ plus

  $\mathsf{Stomach\text{-}Ulcer} \sqsubseteq \exists\mathsf{hasLocation.Lining\text{-}Of\text{-}Stomach}$

  $\Rightarrow \mathsf{Ulcer} \sqcap \exists\mathsf{hasLocation.Stomach} \sqsubseteq \mathsf{OrganLiningLesion}$

- ☞ Inverse roles capture e.g. causes/causedBy relationship

  $\mathsf{Death} \sqcap \exists\mathsf{causedBy.Smoking} \sqsubseteq \mathsf{PrematureDeath}$

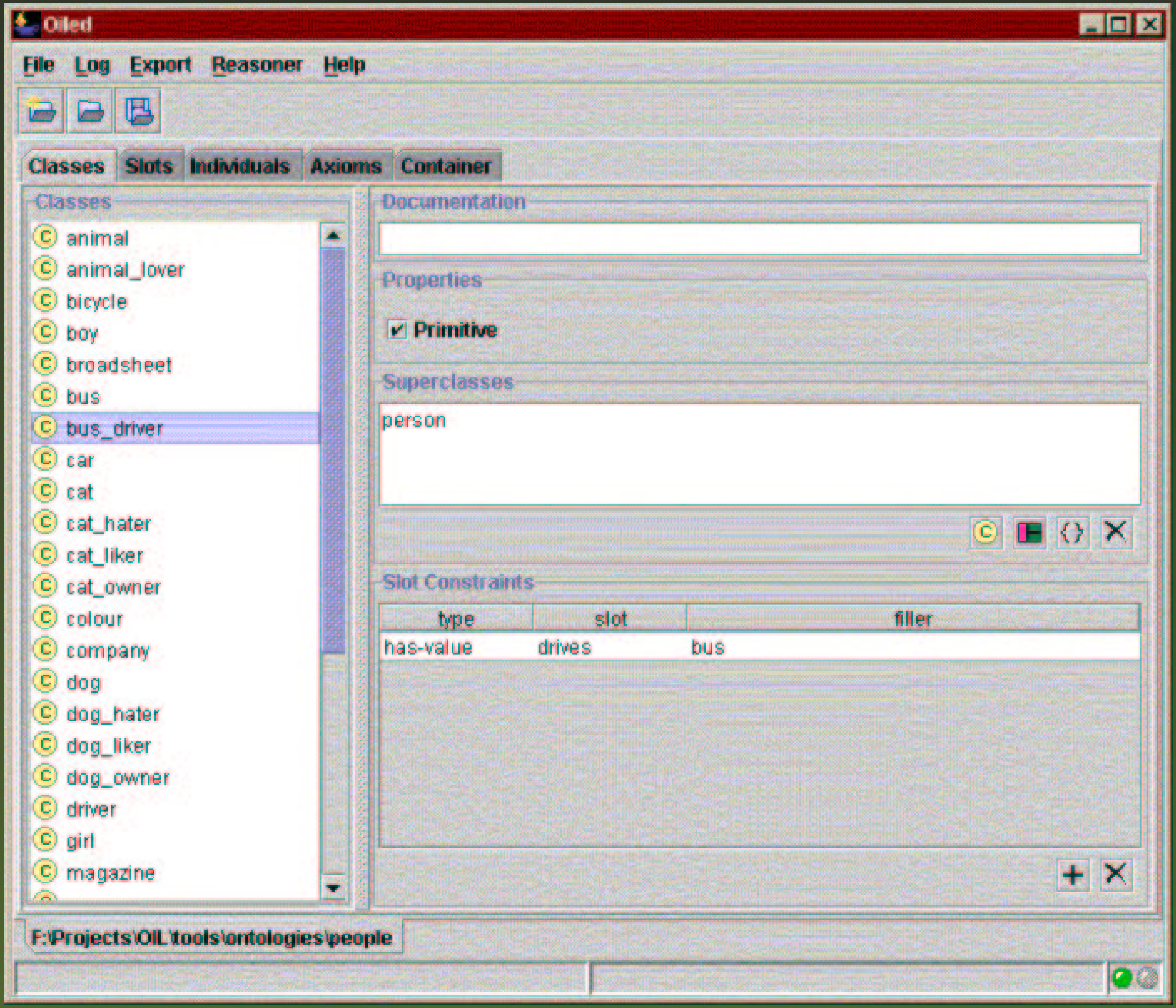
  $\Rightarrow \mathsf{Smoking} \sqsubseteq \mathsf{CauseOfPrematureDeath}$

- ☞ Cardinality restrictions add consistency constraints

  $\mathsf{BloodPressure} \sqsubseteq \exists\mathsf{hasValue}.(\mathsf{High} \sqcup \mathsf{Low}) \sqcap \leqslant 1 \mathsf{hasValue}$ plus

  $\mathsf{High} \sqsubseteq \neg\mathsf{Low} \Rightarrow \mathsf{HighLowBloodPressure} \sqsubseteq \bot$

OilEd Demo



☑ Primitive

Superclasses: person

type	slot	filler
has-value	drives	bus

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