

Exercises for AR@AI - Description Logics (III)

Finding a model

Decide whether \mathcal{A} is consistent w.r.t. \mathcal{T} , where:

\mathcal{T} : $Artist \equiv \exists created.Sculpture \sqcup \exists painted.Artwork$
 $Painting \sqsubseteq Artwork \sqcap \neg Sculpture$
 $Painter \sqsubseteq Artist \sqcap \forall created.Painting$
 \mathcal{A} : $rembrandt : Painter$
 $(rembrandt, nightwatch) : created$

Reasoning

Decide whether $\forall created.Painting \sqcap \exists created.\top$ is subsumed by $\exists created.Painting$.

Solution:

Check whether $\{a : (\forall created.Painting \sqcap \exists created.\top) \sqcap \forall created.\neg Painting\}$ is consistent.

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----- hence the answer is -----

Constructing a canonical model

Construct a canonical model for the following open branch:

$$\{ \begin{array}{l} a:\forall created.Painting \\ a:\exists created.\top \\ a:\forall created.\neg Sculpture \end{array} \}$$
$$\begin{array}{l} (a,b):created \\ b:\top \\ b:Painting \\ b:\neg Sculpture \end{array}$$

Solution:

$$\Delta^{\mathcal{I}} = \{ \text{-----} \}$$
$$Painting^{\mathcal{I}} = \{ \text{-----} \}$$
$$Sculpture^{\mathcal{I}} = \{ \text{-----} \}$$
$$created^{\mathcal{I}} = \{ \text{-----} \}$$