Exercises for AR@AI - Description Logics (II)

Modeling TBoxes

An artist is someone who created an artwork. A sculpture is an artwork. A painting is an artwork that is not a sculpture. A painter is someone who created a painting. A sculptor is someone who created an artwork and created only sculptures. If an artwork is created by an artist, he has either painted or sculptured it. A multi-talent is both a painter and sculptor.

3. Model the information as a DL TBox.

3. Solution:

\[ T = \{ \text{...} \} \]

Modeling ABoxes

Rembrandt created the artwork: “nightwatch”, but never created a sculpture. “nightwatch” is a painting. Michelangelo created at least one sculpture.

5. Model the information as a DL ABox

5. Solution:

\[ A = \{ \text{...} \} \]
Modeling ontology in Protégé

Enter the following KB into Protégé:

\[
\begin{align*}
Artist & \equiv \exists \text{created.Artwork} \\
Sculpture & \sqsubseteq \text{Artwork} \\
Painting & \equiv \text{Artwork} \sqcap \neg \text{Sculpture} \\
Painter & \equiv \exists \text{created.Painting} \\
Sculptor & \equiv \exists \text{created.⊤} \sqcap \forall \text{created.Sculpture} \\
\text{Multitalent} & \sqsubseteq \text{Painter} \sqcap \text{Sculptor}
\end{align*}
\]

(rembrandt, nightwatch) : created

rembrandt : \neg \exists \text{created.Sculpture}

nightwatch : \text{Artwork}

michelangelo : \exists \text{created.Sculpture}