

Tutorial 4: Tractable Schema Reasoning

Week 10

1. Given the following TBox, where A, B, C, D, E, F, H are named classes, while r is a named property:

$$\mathcal{T} = \{C \sqsubseteq D, A \sqsubseteq E, E \sqsubseteq \exists r.F, F \sqsubseteq B, H \sqsubseteq B, F \sqsubseteq H\}$$

Check if the TBox entails $A \sqsubseteq \exists r.B$.

2. Classify the following TBox:

Pericardium \sqsubseteq Tissue $\sqcap \exists$ contained-in.Heart

Pericarditis \sqsubseteq Inflammation $\sqcap \exists$ has-location.Pericardium

Inflammation \sqsubseteq Disease $\sqcap \exists$ acts-on.Tissue

Heartdisease \doteq Disease $\sqcap \exists$ has-location.Heart

Heartdisease $\sqsubseteq \exists$ has-state.NeedsTreatment

3. Given the following TBox, where A, B, C, D are named classes, while r is a named property:

$$A \sqsubseteq B \sqcap \exists r.C$$

$$B \sqcap \exists r.B \sqsubseteq C \sqcap D$$

$$C \sqsubseteq (\exists r.A) \sqcap B$$

$$\exists r.\exists r.B \sqcap D \sqsubseteq \exists r.(A \sqcap B)$$

Check whether the following subsumption relations hold w.r.t. the TBox:

1. $A \sqsubseteq B$

2. $A \sqsubseteq \exists r.\exists r.A$

3. $B \sqcap \exists r.A \sqsubseteq \exists r.C$