



## Logic-Based Ontology Engineering

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### Exercise Sheet 9

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**Exercise 9.1** We consider again the ontology from Exercise 8.2, namely  $\mathcal{O} = (\emptyset, \mathcal{T}, \mathcal{R})$ , with abbreviations for the axioms as follows:

$$\begin{array}{ll} \mathcal{T} = \{ C \sqcap \exists s.E \sqsubseteq F \sqcap D_1, & \textcircled{T_1} \\ C \sqsubseteq A \sqcap B, & \textcircled{T_2} \\ D \equiv D_1 \sqcap \exists r.A_1 \sqcap \exists r.A_2, & \textcircled{T_3} \\ A \sqsubseteq D_1 \sqcap \exists s.(A_1 \sqcap A_2), & \textcircled{T_4} \\ B \sqsubseteq D, & \textcircled{T_5} \\ F \sqsubseteq \exists r.(A_1 \sqcap A_2) \quad \} & \textcircled{T_6} \end{array} \quad \mathcal{R} = \{ s \sqsubseteq r, \quad \textcircled{R_1} \\ \text{ran}(s) = E \quad \} \quad \textcircled{R_2}$$

- (a) Compute all justifications for the consequence  $C \sqcap \exists s.T \sqsubseteq D$  w.r.t.  $\mathcal{O}$  using the black-box algorithm **AllJustifications**.
- (b) What are the diagnoses for this consequence?

**Exercise 9.2** Consider the black-box algorithm **SingleJustification**.

- (a) How does the algorithm need to be modified if we want to split the ontology into three instead of two parts ( $\mathcal{O}_l$ ,  $\mathcal{O}_m$  and  $\mathcal{O}_r$ )?
- (b) Does the modified algorithm run faster than the original one?