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9. Exercises for the Course
'Description Logics'

Exercise 30:

Reconsider the claim: for all $D \in S_{C,\mathcal{T}}$ we have $D \in R(u) \Rightarrow u \in D^{\mathcal{I}_R}$. Show the claim by induction on the structure of D for the missing cases:

- $D = D_1 \sqcup D_2$ and

- $D = \forall r.E$.

Exercise 31:

Show that the transformation of $\mathcal{FL}_0$-concept descriptions into normal form requires only polynomial time.

Exercise 32:

Show that subsumption in $\mathcal{FL}_0$ w.r.t. acyclic TBoxes is in co-NP by giving a polytime reduction from this problem to the inclusion problem for acyclic finite automata (which is in co-NP).

Exercise 33:

Show that exhaustive application of the normalization rules NF1-NF5 to a general $\mathcal{EL}$-TBox terminates in polynomial time.