12. Exercises for the Course
   ‘Description Logics’

Exercise 39:
Consider the concrete domain $N$ defined in Section 7.2 of the lecture. Show that $N$ is admissible.

Exercise 40:
We call the composition of features feature paths. Let $f_1, \ldots, f_m$ and $g_1, \ldots, g_n$ be (not necessarily distinct) features. The concept constructor feature path agreement $(f_1 \circ f_2 \circ \ldots \circ f_m) \downarrow (g_1 \circ g_2 \circ \ldots \circ g_n)$ has the semantics

$$(f_1 \circ f_2 \circ \ldots \circ f_m) \downarrow (g_1 \circ g_2 \circ \ldots \circ g_n)^T = \{ d \in \Delta^T \mid f^T_m(\cdots f^T_2(f^T_1(a)) = g^T_n(\cdots g^T_2(g^T_1(a)) \}.$$

Show that for the DL that extends $\mathcal{ALC}$ with feature path agreements, satisfiability w.r.t. general TBoxes is undecidable.