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13. Exercises for the lecture **Term Rewriting Systems**

Exercise 1:

(a) Apply the basic completion procedure to the following sets of identities:

$$E_1 := \{f(g(f(x))) \approx x\}$$
$$E_2 := \{f(g(f(x))) \approx f(g(x))\}$$

(b) What happens when the improved completion procedure that also simplifies rules is applied to E_1?

Exercise 2:

Show that the encompassment quasi-order $\supseteq_\sim$ is in fact a quasi order and that the associated strict order $\sqsupset$ is a well-founded strict order.

Exercise 3:

Let $\equiv$ denote the equivalence relation associated to $\supseteq_\sim$, i.e., $s \equiv t$ iff $s \supseteq_\sim t$ and $t \supseteq_\sim s$. Show that:

(a) $s \equiv t$ if and only if s and t are equal up to renaming;

(b) for every term s only finitely many (up to renaming) terms t_i exist such that $s \supseteq_\sim t_i$.