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Tutorials for "Automated Reasoning"
Exercise sheet 14

Exercise 14.1:
Let $\Sigma = (\Omega, \emptyset)$ with $\Omega = \{f/2,\ g/2,\ h/1,\ k/2,\ l/1,\ b/0\}$. Compute the dependency pairs of the following TRS R:

$$f(x, h(y)) \to k(f(h(x), y), g(x, h(y))) \quad (1)$$
$$g(h(x), y) \to h(f(x, y)) \quad (2)$$
$$g(x, b) \to f(b, l(x)) \quad (3)$$
$$l(x) \to h(x) \quad (4)$$

Compute the approximated dependency graph (using cap and ren) for R and use the subterm criterion to show that R is terminating. If a graph is modified, depict both the original and the modified graph and indicate the strongly connected components in the graphs.

Exercise 14.2:
Prove: If there is an infinite derivation

$$t^\sharp \to_R^* s_1 \to_{DP(R)} s_2 \to_R^* s_3 \to_{DP(R)} s_4 \to_R^* \cdots,$$

then there is an infinite $\to_R$-derivation starting from t.

Bring your solution to the Q&A session on February 11. By lack of time, it will *not* be checked by the tutors.