Exercise 11.1:

Apply the Knuth-Bendix procedure to the set of equations

\[ E = \{ f(f(x)) \approx g(x), f(a) \approx b \} \]

and transform it into a finite convergent term rewrite system; use the Knuth-Bendix ordering with weight 1 for all function symbols and variables and the precedence \( g \succ f \succ a \succ b \).

Exercise 11.2:

Apply \( \Rightarrow_{\text{KBC}} \) to the following set of equations. Choose an appropriate ordering. As usual one sort for everything.

\[ E = \{ f(g(x), x) \approx h(x), f(g(x), h(y)) \approx f(x, y), h(a) \approx a \} \]

Exercise 11.3:

Apply Knuth-Bendix completion (\( \Rightarrow_{\text{KBC}} \)) to the following set of equations with respect to an LPO with precedence \( g \succ f \succ a \succ b \). As usual one sort and \( x, y \) are variables.

\[ E = \{ f(g(b), y) \approx f(b, y), f(a, a) \approx g(a), g(g(x)) \approx g(x) \} \]

It is not encouraged to prepare joint solutions, because we do not support joint exams.