max planck institut
informatik

Universität
des
Saarlandes
FR Informatik

Bromberger/Möhle/Schwarz/Weidenbach **January 12, 2023**

Tutorials for "Automated Reasoning WS22/23"
Exercise sheet 11

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 $\Rightarrow_{\mathrm{KBC}}$ 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 ($\Rightarrow_{\mathrm{KBC}}$) 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.