Universität des Saarlandes
FR Informatik

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Tutorials for "Decision Procedures for Logical Theories"
Exercise sheet 8

Exercise 8.1: (*4 P.*)
Apply the inference system for list unification to the following set of equations:

$$\begin{aligned} cons(cdr(x), car(x)) &\approx z \\ cons(y, y) &\approx z \end{aligned}$$

Exercise 8.2: (*5 P.*)
Show that the inference system for list unification is terminating (for arbitrary input sets E and R), if the second rule is replaced by

$$s \approx t, E \,;R \quad \rhd_{\mathsf{L}} \quad u \approx t, E \,; R, \quad \text{if } s \Rightarrow_L u.$$

Exercise 8.3: (*9 P.*)
Read page 520 of the paper by Armando, Ranise, and Rusinowitch mentioned in the lecture (see `http://www.mpi-sb.mpg.de/~hg/Vorlesungen/DecisionProcedures-WS02/`) and answer the following questions:

(a) The notation used in this paper differs slightly from the one used in the lecture. What is the meaning of select^I and ARRAY^I ?

(b) In the proof of Lemma 7, the authors claim that the 'only if' case is easy. Why?

(c) In the middle of page 520, there is a condition on the types of function symbols f different from select and store. This condition is used (implicitly) in the proof of Lemma 7. Where?

(d) How does one prove that $I' = I/{\sim}$ is a model of $Ax(\mathcal{A}_e^s)$?

(e) There is a typo in one of the formulas in the proof. Where?

Put your solution into the mail box at the door of room 627 in the MPI building (46.1) before December 19, 14:00.