Universität
des
Saarlandes
FR Informatik

MPI INFORMATIK

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Tutorials for "Logic in Computer Science"
Exercise sheet 5

Exercise 5.1:
Prove part (iv) of Proposition 1.19: Let D', D, and C be ground clauses such that $D, D' \in N$ and $D' \succ D \succ C$. Then

$$I_D \models C \;\Rightarrow\; I_{D'} \models C \;\text{ and }\; I_N \models C.$$

If, in addition, $C \in N$ or $\max(D) \succ \max(C)$:

$$I_D \not\models C \;\Rightarrow\; I_{D'} \not\models C \;\text{ and }\; I_N \not\models C.$$

Exercise 5.2:
Explain the importance of Proposition 1.19, part (v) for the proof of the model existence theorem.

Exercise 5.3:
Prove the following statement: If $(M, \succ)$ is a well-founded total ordering and M is infinite, then there exists a subset $M' \subseteq M$ such that $(M', \succ)$ and $(\mathbb{N}, >)$ are order-isomorphic.

Exercise 5.4:
Compute a most general unifier of

$$\{\, f(x, g(x)) \doteq y,\; h(y) \doteq h(v),\; v \doteq f(g(z), w) \,\}$$

Exercise 5.5:
Implement a function `cnf` in ML that takes a quantifier-free formula (that is, the matrix of a prenex formula), and computes its clausal normal form.

Put your solution into the mail box at the door of room 627 in the MPI building (46.1) before May 16, 11:00 (Group D: before May 21, 11:00). Don't forget to write your name and the name of your tutorial group (B, C, D) on your solution.