T-79.5102 **Autumn 2007**
Special Course in Computational Logic
Tutorial 3

1. Prove that the set of stable models $\mathrm{SM}(P)$ for a normal logic program P is an *antichain*, i.e., if $M, N \in \mathrm{SM}(P)$ and $M \subseteq N$, then $M = N$.

2. Suppose that you are given a *linear order* over a set of elements. You may assume that the set is described by a domain predicate $\mathsf{Elem}(\cdot)$ whereas $\mathsf{LT}(\cdot,\cdot)$ is used to represent the linear order amongst the elements.

   Formalize the following concepts using rules in a *uniform* way, i.e., independently of the interpretations of the relations Elem and LT.

   (a) The minimum element of the order—captured by the relation $\mathsf{Min}(\cdot)$.

   (b) The maximum element of the order—captured by the relation $\mathsf{Max}(\cdot)$.

   (c) Which elements are immediate successors of each other— formalized as the relation $\mathsf{Next}(\cdot,\cdot)$.

3. Write a normal logic program P^8_{queens} which solves the problem of placing eight queens on a 8×8 chess board—not threatening each other.

4. Use the `smodels` system to check how many solutions exist for the 8-queens problem as formulated above.