# Planning with SMODELS

SMODELS is a system for computing answer sets. It differs from DLV in that it is not applicable to programs with classical negation and to disjunctive programs, although it does handle constraints. SMODELS places a stronger restriction on the use of variables than DLV: it expects the given schematic representation of the input program to be *strongly* range-restricted (see pp. 9–10 of *Applications of Logic Programming to Planning*). But when SMODELS is applicable, it is often much faster than DLV.

**Assignment SM-1.** Use SMODELS to solve Problem 26 from the handout on answer sets.

For applications to planning, the unavailability of classical negation is a significant limitation. Fortunately, classical negation can be always eliminated, in a sense, from a logic program. Let $\Pi$ be a logic program (possibly with constraints). For every negative literal $\neg B$ occurring in $\Pi$, select a new atom $B'$. Let $\Pi'$ be the program obtained from $\Pi$ by

- replacing every negative literal $\neg B$ by $B'$, and
- adding the constraints $\leftarrow B, B'$ for all new atoms $B'$.

Then the consistent answer sets for $\Pi$ can be obtained from the answer sets for $\Pi'$ by replacing each new atom $B'$ with $\neg B$.

**Assignment SM-2.** Use SMODELS to find the consistent answer sets for the program

$$\begin{array}{l} p \leftarrow not\ q, \\ q \leftarrow not\ p, \\ \neg p. \end{array}$$

**Assignment SM-3.** Use SMODELS to solve the planning problem from Assignment DLV-6.