Foundations of Logic Programming
Tutorial 5 (on January 5th)

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Exercise 5.1:
Given the program P_i, determine the stable models of P_i by applying the *Gelfond-Lifschitz-Reduct.*

$$P_1 = \{a \leftarrow b, not\ c, d;\quad c \leftarrow not\ b, a;\quad b \leftarrow not\ c, not\ d;\quad a \leftarrow\}$$

$$P_2 = \{a \leftarrow b, not\ c;\quad b \leftarrow c, not\ a;\quad c \leftarrow a, not\ b;\quad b \leftarrow\}$$

$$P_3 = \{a \leftarrow not\ b, c;\quad c \leftarrow not\ a, b\}$$

Exercise 5.2:
The *Seating Problem* is defined as follows. Given some tables of a given number of chairs each, generate a sitting arangement for a number of given guests, such that:

- peoble liking each other should sit at the same table, and
- people disliking each other should not sit at the same table.

Model and solve the seating problem using ASP.

a) Write a Guess-and-Check program for the seating problem.

b) Generate at least two input-instances where at least one has a solution and one does not have a solution.

Implement and test the encodings using one of the ASP solvers, for example gingo/clasp (`http://potassco.sourceforge.net/index.html`) or dlv (`http://www.dlvsystem.com`).

An online tool for ASP including examples and tutorial notes is available at `http://asptut.gibbi.com`.
Further tutorials on ASP:
`http://www.dlvsystem.com/html/DLV_User_Manual.html` and
`http://www.dlvsystem.com/html/The_DLV_Tutorial.html`.

Exercise 5.3:
Model the *Einstein-Puzzle* in ASP. There are four different persons: *Marc, Joey, Sandra* and *Ellen*. Each person likes exactly one of the sports *hiking, volleyball, basketball* or *tennis* and exactly one of the drinks *tea, water, coffee* or *beer*. The favorite sport and drink of each person differs from those of the respective other persons. Moreover you have the following clues:

1. Joey drinks beer.
2. Marc likes neither tea nor volleyball.
3. Either Sandra goes hiking or Joey plays basketball.
4. Ellen plays basketball if Sandra likes tea.
5. The water drinker plays tennis or volleyball.