

IAIP Exercises Week 10

November 10, 2005

1 Problems

1. (*) Dechter, p.188: 6.9.1
2. Dechter, p.189: 6.9.2

2 (*)Interactive Configuration Model

In this exercise you are required to model a product using the *Product Modeler*, a software provided by Configit Software. The trial version can be downloaded from http://www.configit-software.com/p_107.html

The Product Modeler allows you to write logical rules and compile them into a *Virtual Table* (a data structure based on BDDs). More about BDD based configuration technology can be found at: <http://www.configit-software.com/papers/PETO2004.pdf>. After compiling your rules, you can interactively assign values to variables in *virtual table simulator*: after each assignment you get only valid domains for remaining unassigned variables.

2.1 Your task

In this exercise, you are asked to build a *product model* of the coffee machine, whose properties are described in this document in the *requirement specification* section.

1. Start by defining a sufficient number of variables, and their domains
2. Formalize the given rules
3. Use virtual table simulator to simulate the product model, and convince your self about that your rules are written up right

2.2 What to deliver?

You should deliver a print out of your product model (**.pm* file). Also, indicate the total amount of solutions for your model as the correctness of your solution would be judged based on this number (it is displayed by the virtual table simulator).

2.3 Requirement specification

Machine

- The machine can handle 3 kinds of beans: arabic, columbian, hawaiian
- The machine can roast beans in 5 strenghts: mild, light, normal, full, strong
- The machine can ground beans in 3 levels: fine, rough, powder
- The machine can make 8 different kinds of coffee: espresso, filter, american, pressed, latt, ice, cappuccino, instant
- The machine can also make ice cubes, boiling water, steam, hot milk, cold milk

Beans

For the beans, the following holds:

1. Arabic beans can either be roasted strong and grounded fine, or roasted full and grounded rough
2. Columbian beans can be roasted from light to full
3. Hawaiian beams can be roasted from mild to normal
4. Hawaiian beans can not be grounded to powder
5. Fine grounding causes that roasting can not be mild
6. Rough grounding causes that roasting can not be strong
7. Powder grounding causes that roasting neither can be mild or strong

Coffee types

For the coffee types, the following holds:

1. Espresso is made of fine grounded, minimum full beans, using steam and no milk

2. Filter coffee is made using boiling water and can not be made from powder
3. American coffee is made of fine or rough grounded minimum full beans using boiling water
4. Pressed coffee is made of rough grounded beans and boiling water
5. Latte is made like espresso except that also warm milk is used
6. Ice coffee requires ice cubes and no milk
7. Cappuccino is made like espresso except that the beans do not need as a minimum to be full roasted, only normal roasted
8. Instant coffee is made with powder and boiling water