

## Multiagent Systems

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### Exercise Sheet 6

**Due: Friday, June 20, 2pm**

**Important:** Each exercise sheet is to be solved in groups of **two students**. Thus, please note your names on each solution sheet and, if applicable, in the source code (as a comment on top of each source file). The solutions are to be handed in as pdf or plain text files (UTF-8 encoded) using the SVN. We strongly suggest the use of  $\text{\LaTeX}$  for typesetting your solutions. As always so far, you might complete your solutions in English or German.

#### **Exercise 6.1** (Jason, Contract Net Protocol; 5+3+2 points)

This exercise should help you to get familiar with the Contract Net Protocol (CNP). At first, please study Chapter 6.3 of the Jason book, in which an implementation of the CNP in AgentSpeak is described in detail.

Then solve the following tasks:

- a) Instead of each supermarket sending the beer price to the robot directly, change the code for those agents so that they use the contract net protocol.

The robot plays the initiator role and the supermarkets play the participant role. Thus, the robot (repeatedly) sends `cfps` requesting **proposals** from the supermarkets with regard to their current beer prices. The robot then chooses to **accept** at most one proposal and **reject** all remaining ones. If a supermarket's proposal was accepted, it should also supply the robot with beer, of course.

For simplicity, you don't need to consider different products (but you may, if you feel up to it).

- b) Create a new supermarket agent which, when asked by the robot for a proposal, pretends to be a domestic robot itself and asks proposals from other supermarkets also using the CNP (i.e. it plays the initiator role). With the best offer from the others, this supermarket subtracts 1% from the price and, provided that price still gives the supermarket some profit, sends this new value as its own proposal, thereby probably winning the actual CNP initiated by the domestic robot.
- c) Create two instances of the previous supermarket agent. This causes a loop in the CNP! Propose a solution for this problem.

**Exercise 6.2** (Experience report; 2 extra points)

Please (each of you) provide a short (six lines) report on problems you encountered while solving this and the previous exercise sheet. Give one (subjective) example each for, first, one very nice and, second, one rather problematic aspect of programming in AgentSpeak using Jason.