

## Introduction to Multi-Agent-Programming

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### Exercise Sheet 3

Due: November 12th, 2008

**Exercise 3.1** (Logic-Based and Reactive architectures (2 Points))

- (a) Consider the vacuum cleaner example in the lecture. How many rules in total would have to be written for the 3x3 Grid world? How does this change for a 10x10 world? (0.5)
- (b) Describe a subsumption architecture solving this same problem. Assume the following definitions:

$$A = \{Suck, Forward, Turn\}$$

Full Observability, i.e.:  $Dirt = \{0, 1\}$ ,  $X = \{0, \dots, n\}$ ,  $Y = \{0, \dots, n\}$ ,  
 $\Theta = \{North, South, East, West\}$  and

$$P = Dirt \times X \times Y \times \Theta$$

Give sensible definitions for the behaviors  $b(c, a)$ , especially the sets  $c$  and define the inhibition relation. (1.5)

**Exercise 3.2** (Behavior networks (1 Point))

Draw a simple behavior network for the vacuum cleaner world as in the CS:Freiburg case study.

The graph should include:

- The competence modules
- Propositions in the world
- The goals
- pre- and postconditions connected via edges

You can derive propositions, e.g. `location_dirty`, informally from the definitions in the previous exercise (i.e. it is ok to describe them in words, if it is clear, that they can be derived).

**Please send your solution to dornhege and zhangd @informatik.uni-freiburg.de**

*Note: We encourage you to submit the written solution in a **pdf** file. The latex package is available at the exercise web page.*