

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))

- 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)
- 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.*