

Multiagent Systems

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Exercise Sheet 3

Due: Friday, May 23, 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).

After SVN-accounts have been created for you, the solutions are to be handed in as pdf or plain text files (UTF-8 encoded). We strongly suggest the use of \LaTeX for typesetting your solutions.

You might complete your solutions in English or German.

Exercise 3.1 (Jason, Domestic Robot plan library; 2 points)

Suppose that an agent has the following plan library:

```
@p1 +g(X,Y) : true <- ... .
@p2 +g(X,Y) : a(Y) & not b(X) <- ... .
@p3 +g(X,_ ) : a(Y) & Y > X <- ... .
@p4 +g(X,Y)[source(self)] : true <- ... .
@p5 +g(X,Y)[source(self),source(ag1)] : true <- ... .
@p6[all_unifs] +g(10,Y) : a(Y) <- ... .
```

and the following beliefs,

```
a(10).
a(5).
b(20).
```

If the event `+g(10,5)[source(ag1)]` is selected, which plans are relevant and which are applicable?

Exercise 3.2 (Jason, Domestic Robot failure handling; 2 points)

The robot has three plans to achieve the goal `!has(owner,beer)`. If any of those plans fail, or none is applicable, the robot will not achieve the goal and the owner will remain waiting for the beer forever. To avoid this problem, add a failure handling plan for the goal `!has(owner,beer)` that sends a message to the owner informing her/him about the robot being unable to achieve the goal.

Exercise 3.3 (Jason, Domestic Robot changing environment code; 4 points)

Now, we want to change the environment of the domestic robot example. Therefore, you have to open and change the corresponding JAVA files.

- a) In the implementation of the domestic robot environment, we did not check who was the agent requesting the action. For instance, if the robot chooses the action `sip(beer)`, the environment will execute the action as if it had been requested by the owner.

Change the environment implementation (i.e. the Java code) so that only the right agent is allowed to perform each action.

- b) Remove the `move_towards(Place)` action and add four new actions for the robot: `up`, `down`, `left`, and `right`. Note that in this case the location perception for the robot also needs to be improved (e.g. `at(robot,Column,Line)`) so that it can decide what is the best action to take.

Exercise 3.4 (Experience report; 2 points)

Please provide a short (six lines) report on problems you encountered while solving this and the previous exercise sheet. Do you have any suggestions what you would like to study and try out next? Why (or why not) would you consider your acquired knowledge useful for non-academic purposes?