

**Exercise for the lecture Modeling Methods in Computer Science,
Winter Semester 2007/08**

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Consultation-hour: Thursday, 15:00-16:00

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Exercise Sheet 12

Due date: **23.01.2008, 14:00**

Exercise 23: Prolog/SLD-Resolution

Given the following program in Prolog (also see exercise 22):

```

1 at_work( claudia ).
2 at_work( klaus ).
3 not_much_sleep( klaus ).
4 much_sleep( claudia ).
5
6 vivid(X) :- much_sleep(X).
7 tired(X) :- not_much_sleep(X).
8
9 coffeepowder.
10
11 needing_coffee(X) :- tired(X), at_work(X).
12 making_coffee(X) :- needing_coffee(X), coffeepowder.

```

Perform a (graphical) SLD-Resolution for the following query:

?- making_coffee(klaus)

10 Points

Exercise 24: Resolution in First Order Logic

Assuming that a, b, c and d are constants and x_i and y_i variables.

Please show that the following set of clauses is not satisfiable using resolution in first order logic. Illustrate the resolution in its graphical form, including all applied substitutions.

$$\{ \{B(a)\}, \{R(b)\}, \{\neg D(x_3, y_3), E(x_3, y_3)\}, \{\neg R(x_4), F(x_4)\}, \\ \{\neg F(y_5), \neg E(x_5, y_5), F(x_5)\}, \{\neg B(x_6), \neg F(x_6)\}, \\ \{B(c)\}, \{R(d)\}, \{D(c, d)\} \}$$

10 Points