

## **Exercise Sheet 06**

(Datalog Optimization)

**Please note:** The exercises will be neither collected, nor corrected, or graded.

### **Exercise 1**

Try to answer briefly, precisely, and understandable (remember: we will have oral exams – abstracting and explaining is important).

- What is the conceptual difference between Jacobi and Gauss-Seidel iterations?
- Which problem does the semi naïve evaluation method address? How is the problem solved?
- What is the base idea of query rewriting?
- What is the base idea of push selection? When and why does it not work?
- What is the base idea of the magic sets method? What do the actual magic sets contain?

### **Exercise 2**

Given the following Datalog program:

$e(3, 1). e(2, 5). e(2, 3). e(6, 1). e(5, 6).$

$p(X, Y) :- e(X, Y).$

$p(X, Y) :- e(X, Z), p(Z, Y).$

Perform a delta-iteration on the program.

### **Exercise 3**

Given the following Datalog program (parent(X, Y) – read: X is parent of Y):

$parent(raphael, george). parent(maria, george).$

$parent(george, tilo). parent(sonja, tilo).$

$parent(peter, ivonne). parent(karen, ivonne).$

$parent(tilo, john). parent(ivonne, john).$

$parent(benni, anna). parent(doris, anna).$

$ancestor(X, Y) :- parent(X, Y).$

$ancestor(X, Y) :- parent(X, Z), ancestor(Z, Y).$

- Rewrite the program using Magic Sets to answer the following query:  
“Which ancestors link Maria and John?”  
(or  $?ancestor(maria, X), ancestor(X, john).$ )
- Perform a delta-iteration on the rewritten program.