

# Query Optimization

## Exercise Sheet 2

due 31.10.2006

### Exercise 1

(Points)

Show that for chain queries the number of left-deep trees without cross products is:

$$f(n) = 1 + \sum_{k=1}^{n-1} f(k-1) * (n-k) = 2^{n-1} \quad (3)$$

### Exercise 2

(Points)

Demonstrate the steps of the MinSel greedy heuristic and the steps of the Greedy Operator Ordering heuristic for the example from slide 84. Which plan is better?

(2)

### Exercise 3

(Points)

Consider the selection operator  $\sigma$ . Each selection  $\sigma_i$  has a selectivity of  $s_i$  and causes costs of  $c_i$  per input tuple.

1. When is the sum of costs for  $\sigma_1(\sigma_2(e))$  less than the sum of costs for  $\sigma_2(\sigma_1(e))$ . Give the exact condition. (2)
2. Generalizing from a), give a rank function  $rank(\sigma_i)$  such that  $C(\sigma_1(\sigma_2(e))) \leq C(\sigma_2(\sigma_1(e))) \Leftrightarrow rank(\sigma_1) \leq rank(\sigma_2)$  (2)
3. How can this rank function be used during query optimization? How does it affect the search space? (1)