
Theory I, Sheet 12

Submission: hand in by 5th August 2011 before 16:00

- The solutions should be submitted in English.
- You must work on your own and write down your own solution. This does not exclude occasional discussions with your fellow students, but solutions copied from other students will not be accepted.

Exercise 12.1 - Relational Algebra and Calculus

[Points: 2+3]

Based on the already defined basic operators an additional operator, called *division*, can be defined as follows:

Let X_1, X_2 be formats, $X_2 \subset X_1$, $Z = X_1 - X_2$ and $r_2 \neq \emptyset$.

$$r_1 \div r_2 = \{\mu \in \text{Dup}(Z) \mid \{\mu\} \times r_2 \subseteq r_1\} = \pi[Z]r_1 - \pi[Z](((\pi[Z]r_1) \times r_2) - r_1)$$

- In order to understand the intention of defining such an operator, find an appropriate example and explain it using natural language.
- Consider schemata $R(A, B)$, $S(B, C)$ and $T(B)$ with instances r, s and t where $t = \pi[B]s$ holds. Give a relational calculus formula for:

$$R \div T \equiv$$