
Theory I, Sheet 11

Submission: hand in by 3rd 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 11.1 - Relational Algebra and Calculus [Points: 2+3+1+2+2]

Let $\text{attr}(\alpha)$ compute the set of attributes that occur in a selection condition and let R , S and T be relations with formats X , Y and Z respectively. Prove the equivalences:

1. $\text{attr}(\alpha) \subseteq Y \subseteq X \Rightarrow \pi[Y](\sigma[\alpha]R) \equiv \sigma[\alpha](\pi[Y]R)$
2. $Z \subseteq Y \subseteq X \Rightarrow \pi[Z](\pi[Y]R) \equiv \pi[Z]R$
3. $R \bowtie R \equiv R$
4. $X = Y \Rightarrow R \cap S \equiv R \bowtie S$
5. $\text{attr}(\alpha) \subseteq X, \text{attr}(\alpha) \cap Y = \emptyset \Rightarrow \sigma[\alpha](R \bowtie S) \equiv (\sigma[\alpha]R) \bowtie S$