

# Advanced Data Modeling

## Summer Semester 2009

### - Exercises II -

To be handed in before 2009-05-18, 23:59 via email to [bercovici@uni-koblenz.de](mailto:bercovici@uni-koblenz.de) **AND** [dividino@unikoblenz.de](mailto:dividino@unikoblenz.de), subject line: [ADM] ...

1. Model the following scenario using Datalog and draw the dependence graph. Is the resulting program non-recursive Datalog?

*Scenario: Photo management platform.* Lets photoSharing be a platform for publishing and sharing your photo on internet (a simplistic version of Flickr), this platform has four main types of entities: photos, users, groups and tags. Each of these entities has several characteristics. Every user has a set of photos (consider as the right holder). Every photo has a set of tags. A group has a name and members and an administrator. Sub-groups are group which can be part of another one.

John, Thomas, Felix and Marie are users of PhotoSharing. John is the administrator of the group "Koblenz in Summer" and "uni-Koblenz in Summer", this last group is a sub group of the first one. Marie is the administrator of the group "Summer" and Felix is administrator of the group "Winter". The group "Koblenz in Summer" is a sub group of the group "Summer". Thomas is member of the group "uni-Koblenz in Summer", "Koblenz in Summer" and "Summer", and John is member of the group "Winter" and "Summer". Marie is member of the group "Winter" and "Koblenz in Summer". Felix is member of the group "uni-koblenz in Summer". Marie has one photo: "LastSummer.jpg". The photo "LastSummer.jpg" has tags "Summer 2008", and "Summer". The photo "LastWinter.jpg" which belong to Felix, has tags "Winter" and "Winter 2009". The photo of Thomas "Koblenz.jpg" has tags "Summer 2008" and "Koblenz".

2. Formulate the following queries using Datalog and list the results.
  - (a) List all members of group "Summer" which are also member of group "Winter"
  - (b) List all members which are not in the group "Winter"
  - (c) List all photos' tags from the members of the group "Winter"

- (d) List **all** subgroups of the "Summer" group
3. How would you model the following integrity constraints? Write rules, which inter the term 'inconsistent', if any constraint is violatet
- (a) No Person is a member and administrator of a group.
  - (b) Every group has at least a member.
  - (c) Every group has an administrator
  - (d) No group includes itself.
4. Prove that relational algebra has the same expressive power as non-recursive Datalog.
- We can show that every relational operator can be mapped to an equivalent datalog expression and vice versa.