



## Data Models and Query Languages Summer 12

Due/Discussion by 19.07.2012

### 8. Sheet: Conjunctive Queries

#### Exercise 1 (Conjunctive query containment - 10 points)

Given the following queries:

$$Q_1 : q(A, C) \leftarrow a(A, B), a(B, C), a(B, D).$$

$$Q_2 : q(X, Z) \leftarrow a(X, Y), a(Y, Z).$$

Decide whether they are contained in each other.

#### Exercise 2 (Conjunctive Query containment and equivalence - 40 points)

Find all equivalences and containments among the conjunctive queries given below (give the respective containment mappings).

$$Q_1 : p(X, Y) \leftarrow q(X, A), q(A, B), q(B, Y).$$

$$Q_2 : p(X, Y) \leftarrow q(X, A), q(A, B), q(B, C), q(C, Y).$$

$$Q_3 : p(X, Y) \leftarrow q(X, A), q(B, C), q(D, Y), q(X, B), q(A, C), q(C, Y).$$

$$Q_4 : p(X, Y) \leftarrow q(X, A), q(A, c), q(c, B), q(B, Y).$$

Note that the small  $c$  in the last query is a constant.