



Exercise Sheet 7: Relational Calculus (until Thursday, 08.12.2016) (36 points)

Please note: you need **50%** of all exercise points to receive the *Studienleistung* for this lecture. In order to pass the RDB I Module, you need both the *Studienleistung* **and** you need to pass the exam. Exercises have to be turned in until **Thursday before the lecture** either in the lecture hall or into our mailbox at the IFIS floor (Mühlenpfordtstraße 23, 2nd floor). Please do not forget your **Matrikelnummer** and your **tutorial group number** on your solutions. **If you forget** to write your Matrikelnummer and/or your tutorial group number, you get **automatically 0 points**. Your solutions may be in German or English. Unless otherwise specified: **Always use your own words!**

Exercise 7.1 (6 points)

Answer the following questions

1. What is the Open World Assumption (OWA)? (2 point)
2. What is difference between a formula and an atom? (2 points)
3. What is relational completeness? (2 point)

Exercise 7.2 (30 point)

Consider the following relation schema.

Movie(id, title, year)

Person(id, name, gender, birthday)

Genre(name, description)

actor(person → Person, movie → Movie, role)

director(person → Person, movie → Movie)

reviewer(person → Person, movie → Movie, stars)

hasGenre(movie → Movie, genre → Genre)

The schema describes movie data, including the movie's title and the production year. Also actors, reviewers, and directors are described, by introducing the relationship types "actor", "reviewer", and "director", which connects persons with movies. The actor relationship type also includes the role played by the person in the respective movie. Persons are further described by their name, gender, and birthday. A movie can have several reviews. For example the movie "Aliens" can have a 5 star review given by a specific Person. The attribute "stars" of the "reviewer" has a value from 1 to 5 (lowest to highest) to basically indicate the opinion of a person on a movie. A movie can also have several genres, which are further described by a description attribute.

Based on this relation schema, please provide statements returning following results in relational algebra, tuple relational calculus and domain relational calculus:

1. The title of all the movies that have been produced after 1979. (3 points)
2. The name of all drama movies. (3 points).
3. The name of all persons who participated in a "drama" movie. (3 points)
4. The name of all persons who have reviewed the movie "The Angry Silence". (3 points)

5. The name of all persons who have reviewed movies with at least 3 stars. (3 points)
6. The name of all persons who have reviewed “romantic” movies but not “comedy” movies. (3 points)
7. The name of all persons who only played in the movie "Anatomy of a murder" but apart from that in no other movie. (6 points)
8. The name of all persons who have reviewed at least the same movies as “Joe Smith”. (6 points)