Relational Algebra, Relational Tuple Calculus and SQL

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15. september 2015

1. Train your SQL skills. But before you do, exercise your relational algebra [RA] and your relational tuple calculus [RTC] skills withe the following queries. Use MySQL and practice queries on the table `danishMovies` available on LearnIT. To load the data into MySQL either paste the SQL into your database interface window, or use the file as input to the command line interface. For example on OSX, if you first create a schema `mydatabase`, you can use:

   ```
   /usr/local/mysql/bin/mysql -u root -p -h localhost mydatabase < imdb.sql
   ```

   (a) Find the name of movies with at least 10000 IMDB votes. [SQL, RA, RTC]

   (b) Find all movies by Paramount studio [SQL, RA, RTC]

   (c) Find starring Kevin Bacon [SQL, RA, RTC]

   (d) Find stars who have been in a film with Kevin Bacon [SQL, RA, RTC]

   (e) Find stars who have been in a film with Kevin Bacon [SQL, RA, RTC]

   (f) *Find stars within six degrees of Kevin Bacon* [SQL, RA, RTC]

   (g) ** Find stars connected to Kevin Bacon via any number of films [SQL, RA, RTC]

   (h) Find all movies whose title contains the substring '`man`'. [SQL, RA, RTC]

   (i) Find the name of the highest ranked movie. [SQL]

   (j) Find the number of movies for each year. [SQL]

   (k) Find the number of movies for each decade. [SQL]

   (l) Find the year of the least recent movie(s) of each director. [SQL]

   (m) Find the name of the highest ranked movie of each director. [SQL]

   (n) Find the name of all movies whose director has only one movie listed. [SQL]

   (o) Compute a single table with *one attribute* containing all distinct director names and movie titles. [SQL]

(p) Find the name of every movie from a year with more than 10 movies. [SQL]

2. You can also work on problems from the collection of database exams. Some of the more advanced questions should probably be solved after the lecture on October 5.

   (a) Page 6: January 2009 problem 4 (questions c and d are more advanced).

   (b) Page 12: January 2007 problem 3 (questions f and g are more advanced).

   (c) Page 26: January 2006 problem 3.

   (d) Page 48: Trial exam 2003, problem 3.