HW6: Database design and NoSQL

TOTAL points possible: 25 = 7+4+10+4

Grading for this homework will be simplified: 1 point for each correct solution.

Download the latest version of our Jupyter notebooks from our github website. Work through examples 45,47, 51, and 53.

(1) [7pts] Solve the open problems on relational Algebra Activity-45-Relational-Algebra and post your solutions (your code) into the respective field.

(a) Exercise 1a

(b) Exercise 1b

(c) Exercise 1c

(d) Exercise 2a

(e) Exercise 2b

(f) Exercise 2c-1: Create data instance so that the query below has a non-empty result set

(g) Exercise 2c-2: Write the SQL query

(2) [4 pts] Solve the open problems on relational Algebra Activity-47-Query-Optimzation and post your solutions (your code) into the respective field.

(a) Exercise 1

(b) Exercise 2

(c) Exercise 3.1

fasdf

(d) Exercise 3.2

(3) [10pt] Solve the open problems on the IMDB movie database in Activity-51-Redis and post your solutions (your code) into the respective field.

(a) Make an entry for the movie with id 476084 in the IMDB movie database

(b) Make entries for the actors with ids 538826, 1794091, 1810514 in the IMDB movie database

(c) Make entries for the director with id 170296 in the IMDB movie database.

(d) Associate the director d:170296 as the director for movie m:476084, according to the desired schema.

(e) Associate the three actors with the movie, according to the desired scheme. Pay attention that an actor can play multiple roles in a movie. Copy the exact same information as is stored in our IMDB movie database.

(f) Query the number of directors for the movie m:476084.

(g) Query the set of ids for all directors of the movie m:476084.

(h) Determine whether actor a:538826 acted in m:476084. Then repeat the query for actor a:1.

(i) Change the release year of m:476084 to 2018.

(j) Verify that the release year has been updated by retrieving all attributes for movie m:476084.

(4) [4pt] Solve the open problems on the IMDB movie database in Activity-53-MongoDB and post your solutions (your code) into the respective field.

(a) Create a new movie collection and make sure that it is empty before you start adding your documents.

(b) Create an entry for the movie with movie id 476084, including all its attributes (like its name), together with all its directors, and three of its actors, namely those with actor ids 538826, 1794091, 1810514 as found in the IMDB movie database. For each of the actors, don't forget to include their attributes (like fname) and all roles they play in that movie.Create a new movie collection and make sure that it is empty before you start adding your documents.

(c) Create an entry for the movie with movie id 433969, together with all of its 3 directors as listed in our IMDB movie database. Ignore all actors in the movie, but include all movie attributes.

(d) Give a query to get the name of all movies and their directors who were made before 2010.

1. Collaboration Policy

We randomly assign you to groups of approximately 5 students on Blackboard. You will have to submit your individual homework, but we allow you to exchange ideas and brainstorm on solution ideas *within* the randomly assigned group of students. If you received help from one of your assigned team mates, then acknowledge the help of your team mate at the end of this file. Any received help from within the group does not count against you. At the end of the semester, we ask everyone to rate the helpfulness of the team mates you were paired up throughout the semester.

Similar to HW5, you are also allowed to collaborate with *anybody* during office hours and in the presence of the TAs. Thus, you can come to office hours, freely discuss solutions with any other student, finish your homework with others together, it just needs to be during office hours. We only ask you to acknowledge the other students with whom you collaborated (again, we will *not* deduce any points from your homework solution for you having collaborated with anybody during office hours and acknowledged them).

2. Submission policy

Please complete the homework inside your local Juptyer notebooks and then copy your solutions into the appropriate textbox of this PDF file. Then upload your PDF to Gradescope and not Blackboard by the deadline.

3. Acknowledgements

Add here your acknowledgements: "I thank ... for ..." etc.