CSCI 5333.1 DBMS Fall 2021 Homework #3

Relational Algebra

This homework refers to the Sakila SQL database that may come preloaded with MySQL installation. Refer to the general documentation at https://dev.mysql.com/doc/sakila/en/. In this assignment, we are not using SQL, but relational algebra

(1) Provide the relational algebra expressions using the format of the relational algebra interpreter we discussed in class.

First, you need to install the relational algebra (aql.jar) interpreter found in: <u>http://tinman.cs.gsu.edu/~raj/elna-lab-2010/ch2/</u>. Make sure you read the manual: <u>http://tinman.cs.gsu.edu/~raj/elna-lab-2010/ch2/ch2.pdf</u> carefully, especially section 2.2 on the relational algebra interpreter.

Note that in setting up your JDK, you may need to include ".;.*;" as a part of the environment variable CLASSPATH. You will need to use <u>sakila ra.zip</u> to populate the Sakila database for the RA interpreter. Unzip the file and put the folder sakila in the same folder as aql.jar, and then run "java edu.gsu.cs.ra.RA sakila" in the command line at the folder.

A hint: pay attention to the common attributes when you use natural joins.

(a) List the names of all cities in the country with id 12.

```
Number of tuples = 3
Dhaka:
Jamalpur:
Tangail:
```

(b) List the names of all cities in Bangladesh.

```
Number of tuples = 3
Dhaka:
Jamalpur:
Tangail:
```

(c) List the addresses of customers living in Bangladesh.

```
Number of tuples = 3
262 A Corua La Corua Parkway:
1816 Bydgoszcz Loop:
1838 Tabriz Lane:
```

(d) List the names of customers who have rented a film with actor id 1.

```
Number of tuples = 234
LINDA:WILLIAMS:
BARBARA:JONES:
SUSAN:WILSON:
MARGARET:MOORE:
...
```

(e) List the names of customers who have rented a film with actor id 1 and a film with actor id 2.

```
Number of tuples = 112
LINDA:WILLIAMS:
BARBARA:JONES:
LISA:ANDERSON:
HELEN:HARRIS:
RUTH:MARTINEZ:
...
```

(f) List the names of customers who have rented a film with actor id 1 but not a film with actor id 2.

```
Number of tuples = 122
SUSAN:WILSON:
MARGARET:MOORE:
BETTY:WHITE:
SANDRA:MARTIN:
...
```

(g) List the titles of films with no recorded actors.

```
Number of tuples = 3
DRUMLINE CYCLONE:
FLIGHT LIES:
SLACKER LIAISONS:
```

(2) Redo (1) using in RA using Mathematical notations. **Submission:**

Submit your homework through Blackboard with two files:

```
(1) <<Yourname>>_<<YourStudentNUmber>>_h3q1.txt which contains your solution for question (1) in text format. The TA should be able to execute your file in the RA interpreter.
```

Because RA interpreter does not seem to accept comments, your file should just contain a sequence of RA expressions, and nothing else.

(2) <<Yourname>>_<<YourStudentNUmber>>_h3q2.docx which contains your solution for question (2). This is in docx format so you can include Mathematical symbols.