

Written Assignment #1
CS 6530 Fall 2016

Due: Sep 8 (Thursday) in Class.

Problem 1. Relational Algebra [28pts]

Consider the dvdrental schema from the dvdrental database on our database server: <http://www.postgresqltutorial.com/postgresql-sample-database/>. Answer the following queries in relational algebra:

1. Find the customer ids who have rented all films.
2. Print the store id and the phone number for each store that has only one staff member.
3. Find every pair of customer and staff who are from the same city, by listing their customer_id and staff_id.
4. Find the customer ids who *have rented all and only those* films acted by Emily Dee.

Problem 2. [28pts] Answer following queries using Tuple Relational Calculus.

1. Find the customer ids who have rented all films.
2. Print the store id and the phone number for each store that has only one staff member.
3. Find every pair of customer and staff who are from the same city, by listing their customer_id and staff_id.
4. Find the customer ids who *have rented all* films acted by Emily Dee (slightly modified from Problem 1).

Problem 3. [44pts]

We showed how to connect to the database server in class (and in the class website). You can use any PostgreSQL client program (e.g., psql) or connect via linux/unix from one of the CADE machines or shell.cs.utah.edu by “psql -h georgia.eng.utah.edu -U cs6530user dvdrental”. (password has been posted on the announcement section in canvass). Once connected, you can “\t”, “\dt”, “\d”, “\d+”, “\d+ tablename” etc.

Answer the followings using SQL queries. Submit **both your SQL queries and the query results from the database server**. Note that you can store all your SQL queries in a txt file (e.g., query.txt, end each SQL with a semicolon and separate each SQL query with an empty line), and execute them all in once by “\i query.txt”. An example of query.txt with 3 queries is given below:

```
Select * from country;
```

```
Select count(*)  
from  
actor;
```

```
Select count(*) from city;
```

To capture the query results from the database server in Unix/Linux, you can use the “script” command. In particular, when you are ready to execute all your queries from query.txt. Do the followings:

- 1) script output.txt
- 2) connect to the DB server and “\i query.txt;”
- 3) quit the server by “quit” or “exit”
- 4) type ctrl+d to end the scripting process.
- 5) all screen printout will be captured in output.txt.

Questions:

1. Find the customer ids who have rented all films.
2. Print the store id and the address (only need to show the “address” field) for each store that has only one staff member.
3. Find every pair of customer and staff who are from the same city, by listing their customer_id, staff_id and city name.
4. Find the customer ids who *have rented all and only those* films acted by Emily Dee.
5. Find the address and the total inventory count for the store that has the largest inventory (judged by the

count over inventory id).

6. Find the first name, last name, and the number of films acted by the actor who has acted in the least number of films.
7. Print the city name, the total amount of payments by customers from that city, and the total number of customers from that city for each city. Sort the output by the total payment (high to low) and break ties by total number of customers (high to low) and limit the output to top 15 cities.
8. For each country that starts with 'A', show the country name and total number of customers in that country; sort the output by the customer count from high to low.