CS 284, Interim 2018, R. Brown

Homework 4 Due Friday, 1-19-18

XX5

A. SQL queries

1. For your `book/patron` database tables created in the previous database homework, write SQL queries using `SELECT` to determine the following.
   a) Find all information about books by Tanenbaum.
   b) Find the titles and authors of all books.
   c) Find the call numbers of all novels.
   d) Find the names of all patrons who have non-`null` phone numbers. *Note.* Instead of the `=` operator for this comparison (`phone = null`), the SQL `is` operator must be used for comparisons involving `null`, e.g., `phone is null`. See section 9.2 of Postgres documentation for more information.
   e) Find the names and phone numbers of all patrons whose key values are 2 or more.
   f) Find all information about patrons whose names start with `S`. (The Postgres documentation, Section 9.7, provides two approaches for matching patterns `LIKE/SIMILAR TO` and posix regular expressions (Posix is a standard for UNIX systems). You may use either approach.)

To deliver this work, create a file `HW4A.sql` that contains your queries, then use it to create a file `HW4A.out` that contains those queries and their results, and submit the latter file `partname.out` via git with the remainder of your homework for this assignment. *See the recommendations below for creating* `HW4A.out`.

Note: You can check a file of Postgres commands (such as `HW4A.sql`) against your database using the locally written command `dopsql`. First, make sure that you have **blank lines between your queries** or other Postgres commands (the program uses blank lines to determine where queries begin and end). Then, enter the following Linux command.

`%` ∼`cs284/.bin/dopsql` *filename* `>` *outfile*

Here, *filename* is the name of your SQL file, e.g., `HW4A.sql`, and *outfile* is the name of a file for storing the output (use `HW4A.out` for this part). You can see the output on the screen by leaving off `>` *outfile*.

Note: Be sure to start your SQL file *filename* with a command

`set search_path to` *username*`;`

where *username* is your schema name.

B. SQL Joins

See recommendations concerning `dopsql` above for delivering this work.

1. Create a third table described below.

   a) Table `checkouts` represents books checked out to patrons, and its fields are described by the following diagram.

callno	patron

   The call number `callno` should be a key for `book`. The field `patron` should be a key `pid` for `patron`. (Be sure to include foreign key constraints.)

   b) Add rows to `checkouts` to express that Sue checked out *Modern Operating Systems*, Sam checked out *War and Peace*, and Chris checked out *Structured Computer Organization*.

2. Now write SQL join queries using `SELECT` to determine the following. Write two queries for each join task, one using a `WHERE` clause to specify the join condition and one using a `JOIN` clause. See `text/sql.html#joins` for examples.

   a) Find the number of books checked out. (Use the aggregate function `COUNT(*)`, which returns the number of rows matching `SELECT` criteria. A join might not be necessary for this query.)

   b) Find the names of patrons who have checked out a book.

   c) Find the patron names and book authors for all checkouts.

   d) Find the names of patrons who have checked out a book with call number beginning with `TAN`.

   e) Find the titles of books checked out by patrons who have no known phone number.

   f) Find the call numbers for all books that are checked out for which either the book title or the patron name contains a letter `u`.

Create a file `HW4B.out` using `dopsql` with a file of your sql commands as before, and submit `HW4B.out` via git.

C. **SQL queries**

1. The `sailor` tables are defined in `mca/pub/sailors.sql` and have been entered in the `public` schema of the database `mca_i18`. Write SQL queries for the following searches listed in the page `mca/queryegs.html`, then test your queries using `psql`.

   Query numbers: 1, 2, 3, 5, 6, 22, 25, 26, 27, 30

   Notes:

   - You may need to enter the SQL command

     ```
     set search_path to public;
     ```

     in order to access these tables.

   - Submit this work by entering your queries in a file `HW4C.sql`, then producing `HW4C.out` via `dopsql`, and finally submitting `HW4C.out` via git.