CPSC 551 - Distributed Systems - Fall 2019

Project 1, due October 8

RDBMS and Database

The RDBMS for this project is the Datalog Educational System, or DES.

The database is Luis Rocha's Chinook Database, modified for use with DES.

Platforms

You may use any platform supported by DES to develop and test your queries, but note that per the Syllabus the test environment for projects in this course is a Tuffix 2019 Edition r2 Virtual Machine. It is your team's responsibility to ensure that your code runs on this platform.

You can download the 64-bit console version of DES for Tuffix from this link.

Once you have downloaded DES, use the following commands to install `rlwrap`, which will make it easier to interact with the DES console by providing line editing and command history:

```
$ sudo apt update
$ sudo apt install --yes rlwrap
```

Then use the following commands to extract and start DES:

```
$ unzip ~/Downloads/DES6.2Linux64SICStus.zip
$ cd des
$ chmod +x des des_start
$ rlwrap ./des
```

Loading the Database

Download the database file `Chinook_DES.ddb` and place it in the same directory where you extracted DES. The database can be loaded with the following command:

```
DES> /restore_ddb Chinook_DES.ddb
```

Note that the database will take a while to load. (On my laptop it takes about 30 seconds.)

You can view the database schema with `/dbschema` command, or by downloading and viewing `Chinook_DES.sql`.

Recreating the database

If the database does not load, you can recreate the database and save it again using the following commands:

```
DES> /process Chinook_DES.sql
DES> /save_ddb Chinook_DES.ddb
```

but note that this process will take several minutes to complete.

Queries

Write queries in Relational Algebra, Tuple Relational Calculus, and Domain Relational Calculus to determine each of the following:

1. Albums by the artist “Red Hot Chili Peppers.”
2. Genres associated with the artist “U2.”
3. Names of tracks on playlist “Grunge” and their associated artists and albums.
4. Names and email addresses of customers who bought tracks in playlist “TV Shows.”
5. Names of the support representatives whose customers bought tracks in “Purchased AAC audio file” format.

Query Syntax

You can switch between query languages using the commands `/ra`, `/trc`, and `/drc`. Consult `examples/*.ra`, `examples/*.trc`, `examples/*.drc`, and `doc/manualDES.pdf` for query syntax.

Note in particular that per pp. 152 and 159, domain and tuple variables must begin with and uppercase variable and the names of relations must be surrounded by single quotes. For example, the following TRC query should return all tuples in the Playlist relation:

```
{ P | 'Playlist'(P) }
```

Submission

Submit your project by uploading your `.ra`, `.trc`, and `.drc` files and any other relevant artifacts to the `project1/` subdirectory of the folder that will be shared with you on Dropbox.

You may work alone, or make a single submission for a team of 2-3 students. If you work in a team, only one submission is required, but for safety consider uploading copies to each team member's submission folder. (Make certain, however, that the copies are the same in each case; the instructor will not attempt to ascertain which is the “real” submission.)

A printed submission sheet will be provided on the due date. To finalize your submission, fill out the sheet with the requested information and hand it in to the professor by the end of class.

Failure to follow any submission instructions exactly will incur a **10%** penalty on the project grade for all team members.