

CptS -451 Introduction to Database Systems Online

Project Milestone-1

Summary:

In this milestone you will parse the Yelp JSON data and develop a simple database application. The goal of this exercise is to get you started in database programming early on. In Milestone3 you will develop a larger application with all required features.

Milestone Description:

1) Download the Yelp dataset from the Project Description course item on the Learning Management Service website. Look at each JSON file and understand what information the JSON objects provide. Pay attention to the data items in JSON objects that you will need for your application.

Download the JSON Parser program (Python) from Canvas (*ProjectResources\Milestone1\JSON Parsing Code*). This program:

- reads the JSON objects from the data files and extracts certain key and value pairs from JSON objects,
- writes extracted data into text files.

Please make sure to use the downloaded file as a reference. Create your own parser such that it can parse all the following files. The parser you create is expected to function like the reference parser (take same inputs, produce same outputs).

(yelp_business.json, yelp_review.json, yelp_user.json, yelp_checkin.json) found in the given Yelp data. The parser can assume that the data files are in the current directory. In milestone-2, you will update this code and directly insert the data onto a PostgreSQL database.

Parsing Check-in Data: The check-in objects include information about the number of check-ins for a particular business . The “time” check-in JSON objects are in the form of:

“day”: {“hour”: number of checkins ,....}

For example `“Friday”:{“20:00”: 5,“21:00”: 10}` shows that there are 5 check-ins between 20:00pm and 20:59pm and 10 check-ins between 21:00pm and 21:59pm on Friday. (time values are based on 24hour clock (i.e., military time))

2) i) Design a database schema that models the database for the described application scenario in Appendix-A and provide the ER diagram for your database design. Your database schema doesn’t necessarily need to include all the data items provided in the JSON files. Your schema should be precise but yet complete. It should be designed in such a way that all queries/data

retrievals on/from the database run efficiently and effectively. In Milestone2 you will revise your ER model.

ii) Translate your ER model into relations and produce DDL SQL statements for creating the corresponding tables in a relational DBMS. Note the constraints, including key constraints, referential integrity constraints, not NULL constraints, etc. needed for the relational schema to capture and enforce the semantics of your ER design.

3) (i) Download the “milestone1DB.csv” file from the Milestone-1 folder, available in the Project Resources section of the online course space

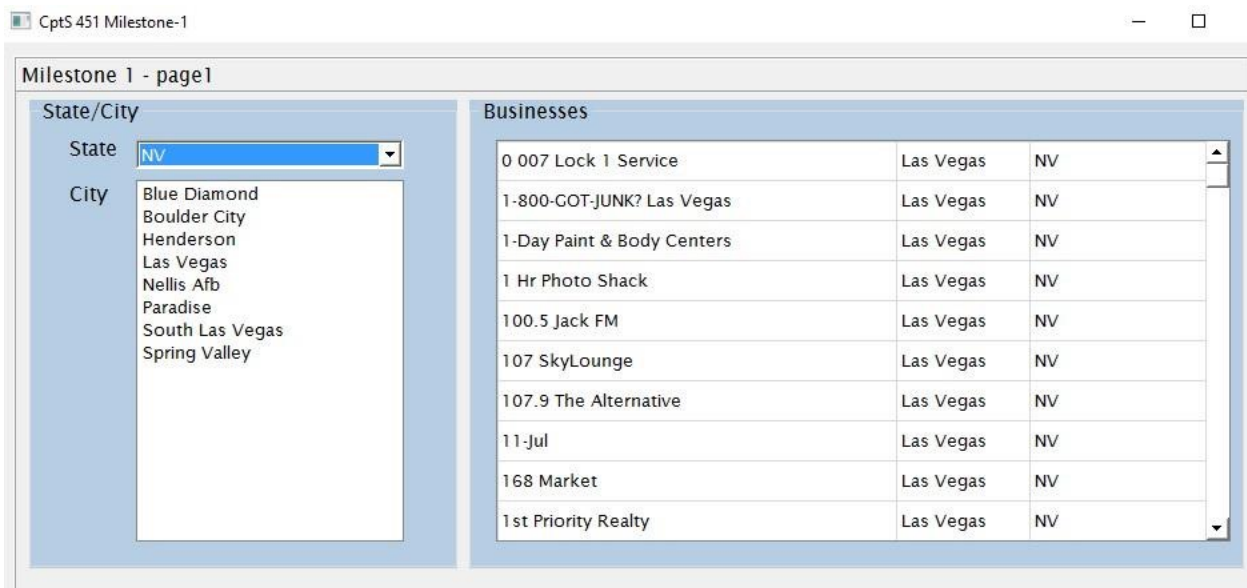
Create a database on PostgreSQL with name “*milestone1db*” and create a table named “*business*”. The schema of the *business* table should comply with the columns of the CSV file, i.e., there should be an attribute for each column of the CSV file. Please define the type and domain of each attribute based on the possible values that appear in the corresponding column.

The “milestone1db.csv” file includes 3 columns: *name* (name of the business), *state*, and *city*. Import the CSV file into this table by executing the following statement in the PostgreSQL command line. Please replace <path> with the directory path for the milestone1DB.csv file.

```
\copy business (name,state,city) FROM '<path>/milestone1DB.csv'
DELIMITER ',' CSV
```

(ii) Write a simple Python application which connects to the *Milestone1DB* database and runs simple queries on the *business* table. A sample screenshot for your milestone1 application is shown below. The application will:

- list the states that appear in business table and allow user to select a state;
- when a state is selected, the cities in that state will be listed;
- when a city is selected the list of the businesses will be listed.



A video tutorial on how to establish connectivity with the PostgreSQL in Python using `psycopg2` is available on Canvas.

You need to run the following queries on the *business* table:

```
SELECT DISTINCT state
FROM business
ORDER BY state;
```

```
SELECT DISTINCT city
FROM business
WHERE state= <selected state>
ORDER BY city;
```

```
SELECT name, city, state
FROM business
WHERE city= <selected city> AND state= <selected state>
ORDER BY name;
```

The skeleton `pyqt5` code is available at the link:

<https://gist.github.com/arslanay/d61b1636d563e18f2680e39803f12282>

Milestone-1 Deliverables:

1. (25%) Source code for parsing all JSON data. Only submit your source code, **not the data files**.
2. (40%) The E-R diagram for your database design and the DDL SQL (i.e., CREATE TABLE) statements for creating the tables.
 - a. Name the ER file “<your-team-name>_ER_v1.pdf” (Should be submitted in .pdf format). To create your ER diagram, you may use your favorite drawing tool (e.g., Visio, Word, PowerPoint, Edraw Max, Lucid Chart).
 - b. Name the file that includes the SQL DDL statements “<your-team-name>_relations_v1.sql”
3. (35%) Source code for your application. Only submit your source code, **not the data files**.

Create a zip archive “<your-team-name>_milestone1.zip” that includes your source code for JSON parsing, E-R diagram and your sample application. Upload your milestone-1 submission on Canvas before the deadline.

You will demonstrate your Milestone1 to the instructor and the TA.

References:

1. Yelp Dataset Challenge, http://www.yelp.com/dataset_challenge/
2. Samples for users of the Yelp Academic Database, <https://github.com/Yelp/dataset-examples>
3. Yelp Challenge, University of Washington Student Paper 1
<http://courses.cs.washington.edu/courses/cse544/13sp/final-projects/p08-fants.pdf>
4. Yelp Challenge, University of Washington Student Paper 2,
<http://courses.cs.washington.edu/courses/cse544/13sp/final-projects/p10-michelmj.pdf>