Assignment 2

Due: Wednesday, November 21st, at 11:59pm
The deadline is definitive and it already accounts for vacation days.

Instructions

- The assignment may be done individually or in groups of up to 3 persons.
- Implement each query in its own plain text file, the file name must be `query_<number>.sql`. Example: `query_8.sql` .
- Each query will be evaluated by an automatic script that will compare its results with the ones from the reference implementation. Each query will then be either correct (+1 point) or wrong (+0 points). Misspelled file names or wrong file encodings count as wrong implementations (+0 points).
- The attributes in the results must be ordered as they appear in the text. Example: "return the agency and the spy name" should be matched with a `SELECT secret_agencies.id, spies.name FROM ...`. Failure to properly order the columns leads to (+0 points).
- Non integer numbers must be round at the second decimal. Example $0.1234 \rightarrow 0.12$.
- **Do not** create additional tables or persistent views.
- **Do not** modify in anyway the existing schema/data.

Delivery
For each group ONLY ONE member needs to deliver.

- Create a `.zip` archive with the 10 `.sql` files and upload it via Google Classroom.
- The name of the archive must be `SQL_mat1_mat2_mat3.zip`, where `mat?` are the *matricole* of the group's members. Example: `SQL_12345_98765.zip`.
- The archive must not contain anything else (no subfolders, no files). Extraction and evaluation is completely automated. Malformed archives, misspelled names, and double submissions will result in a total evaluation of 0 points.

Schema

```sql
CREATE TABLE countries (
    id           INTEGER PRIMARY KEY,
    name         TEXT NOT NULL,
    population   INTEGER NOT NULL);

CREATE TABLE borders (
    country_id1 INTEGER REFERENCES countries,
    country_id2 INTEGER REFERENCES countries,
    PRIMARY KEY (country_id1, country_id2));

CREATE TABLE secret_agencies (
    id                   INTEGER PRIMARY KEY,
    name                 TEXT NOT NULL,
    serves_country_id    INTEGER REFERENCES countries  NOT NULL);

CREATE TABLE operates (
    agency_id    INTEGER REFERENCES secret_agencies,
    country_id   INTEGER REFERENCES countries,
    PRIMARY KEY (agency_id, country_id));

CREATE TABLE spies(
    id           INTEGER PRIMARY KEY,
    name         TEXT NOT NULL,
    country_id   INTEGER REFERENCES countries NOT NULL,
    good_guy     BOOLEAN NOT NULL DEFAULT TRUE);

CREATE TABLE nicknames (
    spy_id       INTEGER REFERENCES spies,
    nickname     TEXT,
    PRIMARY KEY(spy_id, nickname));

CREATE TABLE works (
    spy_id       INTEGER REFERENCES spies,
    agency_id    INTEGER REFERENCES secret_agencies,
    PRIMARY KEY(spy_id, agency_id));

CREATE TABLE missions (
    mission_id               INTEGER PRIMARY KEY,
    codename                 TEXT NOT NULL,
    primary_target           TEXT NOT NULL,
    secondary_target         TEXT NOT NULL,
    duration                 INTEGER NOT NULL,
    supervised_agency_id     INTEGER REFERENCES secret_agencies NOT NULL,
    completed                BOOLEAN NOT NULL DEFAULT FALSE);

CREATE TABLE legs (
    mission_id   INTEGER REFERENCES missions,
    legno        INTEGER,
    country_id   INTEGER REFERENCES countries NOT NULL,
    PRIMARY KEY (mission_id, legno));

CREATE TABLE works_on (
    spy_id       INTEGER REFERENCES spies,
    mission_id   INTEGER REFERENCES missions,
    grade        INTEGER NOT NULL,
    PRIMARY KEY (spy_id, mission_id));
```

create–schema.sql

Queries

1. Find the agencies that operate in the countries which they serve. For each such agency, return its name.

2. Find the agencies that operate in any three distinct countries that pairwise border each other. For each such agency return its name, and the names of the three bordering countries ordered alphabetically (a→z).

3. Find agencies that are in potential trouble. An agency is in trouble if the dominant nationality of its spies is a country that borders with the country that the agency serves. For example, if the CIA employs 35 Americans, 40 Canadians and 25 Mexicans then the CIA is in trouble. However, if the CIA employs 35 Americans, 40 Greeks and 25 Mexicans then the CIA is not in trouble since Greece doesn't have a common border with the USA.

4. For all completed missions with at least three spies, find the average performance grade of the spies that participated. For each such mission, return its name and the average performance.

5. Find the missions in which both the spy with name 007 and the spy with name 008 participated. For each such mission, list its name and the primary and secondary targets.

6. Find the missions with the second highest duration. For each such mission, return its name.

7. Find the missions in which each of its legs took place into a different country. For each such mission, return its id and name.

8. For each mission, find the percentage of participating spies that worked for the CIA. Return the mission name and the corresponding percentage.

9. Find all the countries in which:

   (a) there is a pending mission, and

   (b) In this pending mission the spy with the nickname 'Mr. Big' participates.

   For each such country, return its name.

10. For each country, find the number of missions that had at least one leg in this country. For each such country, return its name and the corresponding number of missions.