Class:

S6 ICT

Date:

Friday, June the 3rd, 2022

Teacher:

Mr Barsamian

B Test — With computer

Family name: _____

First name: _____

Grade: ____ / 10

Duration: 30 minutes.

This test has to be done on computer, although part of it can be handled on paper. At the end of the test, make sure to upload the python file on the Teams assignment (or on your teacher's USB key).

There is a bonus question, and it is highly advised to do it only at the end, when everything else has been done.

If needed, the candidate can also handle some comments inside the code or on paper.

Please keep track of the clock, and avoid spending too much time on a question. Stay focused, and good luck!

<u>Short description of this work:</u>

You are working in an astrophysical research team. You are in charge of one of the databases. It is the same example as yesterday.

1 Introduction   0 points

Please start by downloading the following files; you'll have to update the python file for this test:

http://www.barsamian.am/2021-2022/S6ICTE/BTest_Satellites.py

http://www.barsamian.am/2021-2022/S6ICTE/BTest_Satellites.sql

The big picture of the database is the following: there is a table containing data about the planets of the solar system, and another table about some satellites of those planets:

- planets: <u>id</u>, name, sun_distance, day_length, type
- satellites: <u>name</u>, #planet_id, diameter, mass

In the table "planets", the primary key is the id (an integer). Each planet has a name, a distance from the sun (in astronomical units), a day length (in hours), and a type (its main composition).

In the table "satellites", the primary key is the name. Each satellite has a planet_id (an external key giving the id of the planet around which it revolves), a diameter (in kilometers) and a mass (in 10^{16} kilograms).

Table 1 is the full table on which you'll work, and Table 2 is an excerpt of the full table (full version is in the computer files).

id	name	sun_distance	day_length	type
1	Mercury	0.4	1,408	rock
2	Venus	0.7	5,832	rock
3	Earth	1	24	rock
4	Mars	1.5	25	rock
5	Jupiter	5.2	10	gas
6	Saturn	9.5	11	gas
7	Uranus	19.2	17	ice
8	Neptune	30.1	16	ice

Table 1: The solar system planets — sun distance in astronomical unit, day length in hours.

name	planet_id	diameter	mass
Moon	3	3,474.8	7,342,000
Deimos	4	12.4	0.14762
Phobos	4	22.5334	1.0659
Metis	5	43	3.6
Adrastea	5	16.4	0.20
Amalthea	5	167	208
Thebe	5	98.6	43
Io	5	3,643.2	8,931,900
Europa	5	3,121.6	4,799,800
S/2003 J 18	5	2	0.00042
Eupheme	5	2	0.00042
S/2010 J 2	5	1	0.000052
S/2016 J 1	5	1	0.000052
Mneme	5	2	0.00042
. . .			

Table 2: The satellites (excerpt) — diameter in kilometers, mass in 10^{16} kilograms.

2 Questions   5 points

For each of the following questions, you must write a single SQL request that answers the question. You can answer on paper or in the Python file.

1. Which planets are not gas planets?

2. What are the names of the nine satellites with the biggest diameter?

3. Which satellites revolve around a gas planet?

4. Which satellites have an "e" (capital or not) in their name?

For this BONUS question, you are not limited to only one SQL request. Write a code that can answer the question (write your answer in the function `doQuestionBonus`).

BONUS Which satellites have a year (from $2,000$ to this year) in their name?