Class: S6 ICT

Date: Friday, April the 28th, 2023

Teacher: Mr Barsamian

B Test — With computer

Family name: _____

First name: _____

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!

Short description of this work:

You are working in a supermarket. You are in charge of the database. It is the same example as in the test without computer, the previous period.

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/2022-2023/S6ICTA/BTest_Prices.py

http://www.barsamian.am/2022-2023/S6ICTA/BTest_Prices.sql

The big picture of the database is the following: there is a table containing data about the items that your supermarket is selling, another one about the producers where you buy them, and a last one about the prices:

- producers: id, name, country_name, nb_employees
- items: id, #producer_id, name, type
- prices: #item_id, date_update, price_per_item, price_per_kg

In the table "producers", the primary key is the id (an integer). Each producer has a name, a country of origin, and gives its total number of employees.

In the table "items", the primary key is the id (an integer). The producer_id is an external key, it gives the id of the producer where you buy the item. Each item has a name and a type. There are three main types of items (food items, kitchen items, office items).

In the table "prices", the primary key is the couple (item_id, date_update). The item_id is an external key, it gives the id of the item. The date_update gives the date when the price was last updated for this item. Each item has either a price_per_item (if this is a single item, for instance a bottle of milk, a pack of pastas...) or a price_per_kg (it this is an item which is sold depending of its mass, for instance bulk vegetables, bulk chocolate...). One of the prices will thus be a real number, the other one will be `NULL`.

We give in Table 1, Table 2 and Table 3 excerpts from the tables of the database on which you'll work for this test (they are not the full tables).

id	name	country_name	nb_employees
1	Organic Farmers	Belgium	60
2	Tree Huggers	France	20
3	Easy Office	Belgium	11
4	Spanish Greenhouses	Spain	80
5	Kitchen Helpers	Belgium	14
6	Happy Cows	Belgium	4
7	All About Office	France	9
8	Famous Pastas	Italy	5

Table 1: The producers.

id	producer_id	name	type
1	1	carrots	food
2	1	milk (1L bottle)	food
3	1	sausages (pack of 3)	food
4	1	sausages (pack of 6)	food
5	1	apples	food
6	3	paper (100 pages)	office
7	3	blue pen	office
8	3	black pen	office
9	3	red pen	office
10	3	stapler	office
11	3	staples (pack of 100)	office
12	2	apples	food
13	2	pears	food
14	2	cherries	food
15	2	apricots	food
16	2	nuts	food
17	4	strawberries	food
18	4	blueberries	food
...			

Table 2: The supermarket items (excerpt).

item_id	date	price_per_item	price_per_kg
1	2023-04-17	NULL	1.15
2	2023-04-17	1.4	NULL
3	2023-04-17	4.5	NULL
4	2023-04-17	8.1	NULL
5	2023-04-17	NULL	2.54
6	2023-04-17	3.99	NULL
7	2023-04-17	0.89	NULL
8	2023-04-17	0.99	NULL
9	2023-04-17	0.89	NULL
10	2023-04-17	2.5	NULL
11	2023-04-17	1.99	NULL
12	2023-04-17	NULL	2.54
13	2023-04-17	NULL	2.67
14	2023-04-17	NULL	4.99
15	2023-04-17	NULL	3.5
16	2023-04-17	NULL	8.99
17	2023-04-17	NULL	6.99
18	2023-04-17	NULL	5.7
...			

Table 3: The prices (excerpt).

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 producers do not come from Belgium?
2. Which items come from a Belgium producer?
3. I have 5 euros.
   (a) List the items I can buy with those 5 euros, if I want to buy only one item that has a "price_per_item"?
   (b) List the items I can buy with those 5 euros, if I want to buy only 500 g of one item that has a "price_per_kg"?
4. Give the list of countries of producers, where the name of the country contains an "a" (lowercase or uppercase).

For this last 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 Give, for each type of items, the number of producers that produce this kind of items.