Bases de Dados - 2021/22

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Projeto de Bases de Dados – Parte 2

Grupo 122 – Turno L20

Aluno	**Horas de trabalho**
Carolina Coelho (99189)	13 horas (33.3%)
Gonçalo Nunes (99229)	13 horas (33.3%)
João Fonseca (95749)	13 horas (33.3%)

Modelo Relacional

Point_Of_Retail(address,name)

Ivm(serial_number, manuf)

installed_at(serial number, manuf, address, nr)
- serial_number, manuf: FK(Ivm)
- address: FK(Point_Of_Retail)

Retailer(TIN,name)
- UNIQUE(name)

Shelve(serial_number, manuf, nr, height,categ_name)
- serial_number, manuf: FK(Ivm.serial_number, Ivm.manuf)
- categ_name: FK(Category.name)
- IC-1: serial_number,manuf must exist in Ambient_Temp_Shelf or Warm_Shelf or Cold_Shelf
- IC-2: No shelve can exist at the same time in Ambient_Temp_Shelf, Warm_Shelf or/and Cold_Shelf

Ambient_Temp_Shelf(serial number, manuf, nr, height)
- serial_number, manuf, nr: FK(Shelve.serial_number, Shelve.manuf, Shelve.nr)

Warm_Shelf(serial number, manuf, nr, height)
- serial_number, manuf, nr: FK(Shelve.serial_number, Shelve.manuf, Shelve.nr)

Cold_Shelf(serial number, manuf, nr, height)
- serial_number, manuf, nr: FK(Shelve.serial_number, Shelve.manuf, Shelve.nr)

Product(ean,descr)
- IC-3: Every Product (ean) must participate in the has association

planogram(ean, serial_number, manuf, nr, faces, units, loc)
- ean: FK(Product)
- serial_number, manuf, nr: FK(Shelve.serial_number, Shelve.manuf, Shelve.nr)

Category(name)
- IC-4: name must exist in Simple_Category or Super_category
- IC-5: No shelve can exist at the same time in Simple_Category and Super_Category

Simple_Category(name)
- name: FK(Category.name)

Super_Category(name)
- name: FK(Category.name)

has_other(sub_category_name, super_category_name)

- super_category_name: FK(Super_Category.name)
- sub_category_name: FK(Category.name)
- IC-6: super_category_name is always different from sub_category_name
- IC-7: there can't be cycles between categories

has(ean,name)

- ean: FK(Product)
- name: FK(Category)

responsible_for(serial_number, manuf, categ_name, TIN)

- serial_number, manuf: FK(Ivm)
- categ_name: FK(Category.name)
- TIN: FK(Retailer)

Replenishment_event(ean, serial_number, manuf, nr, instant, TIN, units)

- serial_number, manuf, nr, ean: FK(Planogram.nr, Planogram.ean, Planogram.serial_number, Planogram.manuf)
- TIN: FK(Retailer)

IC-8: a Product can only be replenished on a Shelf where its Category is displayed.
IC-9: units replenished cannot exceed the number of units specified in planogram
IC-10: a Product can only be replaced by the Retailer responsible for the Product category

Álgebra Relacional

Pergunta 1

$$\text{high\_replanished\_products\_from\_instant} \leftarrow \pi_{\text{ean}}(\sigma_{\text{instant} > \text{"2021/12/31 23:59"}} \text{ and } \sigma_{\text{units} > 10}(\text{Replenishment\_event}))$$

$$\text{products\_with\_description} \leftarrow (\text{Product} \bowtie \text{high\_replanished\_products\_from\_instant})$$

$$\text{desired\_products} \leftarrow \pi_{\text{ean, descr}}(\sigma_{\text{name} = \text{"Barras Energéticas"}}(\text{products\_with\_description} \bowtie \text{has}))$$

Pergunta 2

$$\text{desired\_products} \leftarrow \pi_{\text{serial\_number}}(\sigma_{\text{ean} = \text{"9002490100070"}}(\text{planogram}))$$

Pergunta 3

$$\text{sub\_category\_count} \leftarrow \rho_{\text{count()} \mapsto \text{sub\_categ\_count}}(G_{\text{count()}}(\sigma_{\text{super\_category\_name} = \text{'Sopas Take-Away'}}(\text{has\_other})))$$

Pergunta 4

$$\text{replenished\_units\_ean} \leftarrow_{\text{ean}} G_{\text{sum(units)}}(\text{Replenishment\_event})$$

$$\text{products\_with\_units} \leftarrow (\text{replenished\_units\_ean} \bowtie \text{Product})$$

$$\text{products\_with\_units2} \leftarrow \rho_{\text{sum(units)} \mapsto \text{units2, ean} \mapsto \text{ean2, descr} \mapsto \text{descr2}}$$

$$\text{max\_product} \leftarrow (\pi_{\text{ean, descr}}(\text{products\_with\_units}) - \pi_{\text{ean, descr}}(\text{products\_with\_units} \bowtie_{\text{sum(units)} < \text{units2}} \text{product\_with\_units2}))$$

SQL

```sql
--1)

SELECT p.ean, p.descr
FROM Product AS p
INNER JOIN Replenishment_event AS r ON r.ean=p.ean
INNER JOIN has AS h ON h.ean=p.ean
WHERE r.instant > 2021/12/31 23:59 AND r.units > 10 AND h.categ_name='Barras Energéticas'
GROUP BY p.ean
--2)

SELECT p.serial_number
FROM planogram AS p
WHERE p._ean=9002490100070
GROUP BY p.serial_number

--3)

SELECT COUNT(h.sub_category_name) AS sub_categ_count
FROM has_other AS h
WHERE h.super_category_name='Sopas Take-Away'


--4)

WITH t1 AS (
    SELECT p.ean, p.descr, SUM(r.units) AS units_sum
    FROM Product AS p
    NATURAL JOIN Replenishment_event AS r
    GROUP BY p.ean)

SELECT t1.ean, t1.descr
FROM t1
WHERE t1.units_sum = (
    SELECT MAX(units_sum)
    FROM t1)
```