



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 shelf 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 shelf 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(lvm)
- 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

$$\begin{aligned} \text{high_replanished_products_from_instant} &\leftarrow \pi_{\text{ean}, \text{units}}(\sigma_{\text{instant} > "2021/12/31\ 23:59" \text{ and } \sigma_{\text{units} > 10}(\text{Replenishment_event})) \\ \text{products_with_description} &\leftarrow \pi_{\text{ean}, \text{descr}}(\text{Product} \bowtie \text{high_replanished_products_from_instant}) \\ \text{desired_products} &\leftarrow \pi_{\text{ean}, \text{descr}}(\sigma_{\text{name} = "Barras Energéticas"}(\text{products_with_description} \bowtie \text{has})) \end{aligned}$$

Pergunta 2

$$\text{desired_products} \leftarrow \pi_{\text{serial_number}}(\sigma_{\text{ean} = "9002490100070"}(\text{planogram}))$$

Pergunta 3

$$\text{sub_category_count} \leftarrow \rho_{\text{count}() \rightarrow \text{sub_categ_count}}(G_{\text{count}()}(\sigma_{\text{super_category_name} = 'Sopas Take-Away'}(\text{has_other})))$$

Pergunta 4

$$\pi_{\text{ean}, \text{descr}}(\text{Product} \bowtie (\text{ean}, \text{descr}) G_{\max(\text{sum})}(\text{ean}) G_{\text{sum}(\text{units})}(\text{Replenishment_event})))$$

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'
```

--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'
GROUP BY h.super_category_name
```

--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)
```