

# Projeto de BD – Parte 2

Grupo 136 – Turno BD2L14

Professor Flávio Martins

Aluno	Contribuição	Esforço Total
André Azevedo (92424)	34%	4 horas
Maria Gomes (97856)	33%	4 horas
Sara Marques (93342)	33%	4 horas

## Modelo Relacional

IVM(serial number, manuf)

Point of Retail(name, address)

installed-at(serial number, manuf, address, nr)

- serial number, manuf: FK(IVM)
- address: FK(Point of Retail)

Shelve(serial number, manuf, nr, height, name)

- serial number, manuf: FK(IVM)
- name: FK(Category)
- IC-1: serial number, manuf and nr must exist in Ambient Temp Shelf and/or Warm Shelf and/or Cold Shelf
- IC-2: No Shelve can exist at the same time in 'Ambient Temp Shelf' and in 'Warm Shelf', or, in 'Ambient Temp Shelf' and in 'Cold Shelf', or, in 'Warm Shelf' and in 'Cold Shelf'

Ambient Temp Shelf(serial number, manuf, nr)

- serial number, manuf, nr: FK(Shelve)

Warm Shelf(serial number, manuf, nr)

- serial number, manuf, nr: FK(Shelve)

Cold Shelf(serial number, manuf, nr)

- serial number, manuf, nr: FK(Shelve)

Product(ean, descr)

- IC-3: Every Product(ean) must participate in the 'has' relation

planogram(serial number, manuf, nr, ean, faces, units, loc)

- serial number, manuf, nr: FK(Shelve)
- ean: FK(Product)

Category(name)

- IC-4: name must exist in Simple Category and/or Super Category
- IC-5: No Category can exist at the same time in 'Simple Category' and in 'Super Category'

Simple Category(name)

- name: FK(Category)

Super Category(name)

- name: FK(Category)
- IC-6: Every Super Category(name) must participate in the ‘has-other’ relation

has-other(super\_category\_name, category\_name)

- super\_category\_name: FK(Super Category.name)
- category\_name: FK(Category.name)
- IC-7: super\_category\_name is always different from category\_name

has(ean, name)

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

Retailer(TIN, name)

- UNIQUE(name)

responsible-for(TIN, serial number, manuf, name)

- TIN: FK(Retailer)
- serial number, manuf: FK(IVM)
- name: FK(Category)

Replenishment event(serial number, manuf, nr, ean, instant, units, TIN)

- serial number, manuf, nr, ean: FK(planogram)
- TIN: FK(Retailer)

IC-8: There cannot be cycles in the Categories hierarchies

IC-9: The number of units replenished in a Replenishment event cannot exceed the number of units specified in the planogram

IC-10: A Product can only be replenished on a Shelf where its Category is displayed

IC-11: A Product can only be replenished by the Retailer responsible for the Product’s Category



## Álgebra Relacional

1.

$S \leftarrow \text{ean} \text{G}_{\text{SUM}}(\text{units})(\sigma_{\text{instant} > '2021/12/31'}(\text{Replenishment event}))$   
 $\pi_{\text{ean}, \text{descr}}(\sigma_{\text{name} = \text{'Barras Energéticas'} \wedge \text{units} > 10}(\text{has} \bowtie \text{Product} \bowtie S))$

2.

$\pi_{\text{serial number}}(\sigma_{\text{ean} = 9002490100070}(\text{planogram}))$

3.

$\text{G}_{\text{count}}(\sigma_{\text{super\_category\_name} = \text{'Sopas Take-Away'}}(\text{has-other}))$

4.

$S \leftarrow \text{ean} \text{G}_{\text{SUM}}(\text{units})(\text{Replenishment event})$   
 $\pi_{\text{ean}, \text{descr}}(\text{Product} \bowtie \sigma_{\text{max} = \text{units}(S \times \text{G}_{\text{MAX}}(\text{units}) \mapsto \text{max}(S)))$

## SQL

1.

```
SELECT ean, descr
FROM Product
    NATURAL JOIN has
    NATURAL JOIN (
        SELECT ean, SUM(units)
        FROM Replenishment event
        WHERE instant > '2021/12/31'
        GROUP BY ean
    )
WHERE name = 'Barras Energéticas' AND units > 10
```

2.

```
SELECT serial number
FROM planogram
WHERE ean = 9002490100070
```

3.

```
SELECT COUNT(*)
FROM has-other
WHERE super_category_name = 'Sopas Take-Away'
```

4.

```
SELECT ean, descr
FROM Product
    NATURAL JOIN (
        SELECT ean, SUM(units)
        FROM Replenishment event
        GROUP BY ean
        HAVING SUM(units) >= ALL (
            SELECT SUM(units)
            FROM Replenishment event
            GROUP BY ean
        )
    )
```