**Bases de Dados**

Instituto Superior Técnico – LEIC-A

Projeto – 2ª Entrega – Grupo 42

Turno BD2L15 – Prof. Daniela Machado

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1. **Tradução para o Modelo Relacional**

**point\_of\_retail (address, name)**

**ivm (serial\_number, manuf)**

**shelf (serial\_number, manuf, nr, name, height)**

* serial\_number, manuf: FK (ivm.serial\_number, ivm.manuf)
* name: FK (category.name)
* **IC-1**: serial\_number, manuf must exist in exactly one of ‘ambient\_temp\_shelf’, ‘warm\_shelf’ or ‘cold\_shelf’

**ambient\_temp\_shelf (serial\_number, manuf, nr)**

* serial\_number, manuf, nr: FK (shelf.serial\_number, shelf.manuf, shelf.nr)

**warm\_shelf (serial\_number, manuf, nr)**

* serial\_number, manuf, nr: FK (shelf.serial\_number, shelf.manuf, shelf.nr)

**cold\_shelf (serial\_number, manuf, nr)**

* serial\_number, manuf, nr: FK (shelf.serial\_number, shelf.manuf, shelf.nr)

**product (ean, descr)**

* **IC-2**: Every product (ean) must participate in the ‘has’ association.

**retailer (tin, name)**

* UNIQUE (name)

**replenishment\_event (ean, serial\_number, manuf, nr, instant, tin, units)**

* ean: FK (product.ean)
* serial\_number, manuf, nr: FK (shelf.serial\_number, shelf.manuf, shelf.nr)
* tin: FK (retailer.tin)

**category (name)**

* **IC-3**: name must exist in exactly one of ‘simple\_category’ or ‘super\_category’

**simple\_category (name)**

* name: FK (category.name)

**super\_category (name)**

* name: FK (category.name)

**installed\_at (address, serial\_number, manuf, nr)**

* address: FK (point\_of\_retail.address)
* serial\_number, manuf: FK (ivm.serial\_number, ivm.manuf)

**planogram (ean, serial\_number, manuf, nr, faces, units, loc)**

* ean: FK (product.ean)
* serial\_number, manuf, nr: FK (shelf.serial\_number, shelf.manuf, shelf.nr)

**responsible\_for (tin, serial\_number, manuf, name)**

* tin: FK (retailer.tin)
* serial\_number, manuf: FK (ivm.serial\_number, ivm.manuf)
* name: FK (category.name)

**has (ean, name)**

* ean: FK (product.ean)
* name: FK (category.name)

**has\_other (super\_name, sub\_name)**

* super\_name: FK (category.name)
* sub\_name: FK (category.name)
* **IC-4**: super\_name is always different from sub\_name

**Outras restrições de integridade** (não convertíveis para o modelo relacional)**:**

* **IC-5**: Não podem existir ciclos nas hierarquias de categorias (uma categoria não pode ser simultaneamente super-categoria e sub-categoria de outra).
* **IC-6**: O número de unidades repostas num evento de reposição não pode exceder o número de unidades especificado no planograma.
* **IC-7**: Um produto só pode ser reposto numa prateleira onde a sua categoria seja apresentada.
* **IC-8**: Um produto só pode ser reposto pelo retalhista responsável pela categoria do produto.

1. **Álgebra Relacional**
2. πean, descr (σunits > 10 ⋀ instant > ‘2021/12/31’ ⋀ name = ‘Barras Energéticas’ (product ⋈ replenishment\_event ⋈ has))
3. πserial\_number, manuf (σean = 9002490100070 (planogram))
4. πcount (σsuper\_name = ‘Sopas Take-Away’ (super\_nameGcount () (has\_other)))
5. replenished eanGsum(units) → sum (replenishment\_event)

πean,descr (Gmax(sum)(replenished) ⋈replenished ⋈ product)

1. **SQL**
2. **SELECT** ean, descr

**FROM** product **NATURAL JOIN** replenishment\_event **NATURAL JOIN** has

**WHERE** units > 10

**AND** instant > ‘2021/12/31’

**AND** name = ‘Barras Energéticas’;

1. **SELECT** serial\_number

**FROM** planogram

**WHERE** ean = 9002490100070;

1. **SELECT** **COUNT** (super\_name)

**FROM** has\_other

**WHERE** super\_name = ‘Sopas Take-Away’;

1. **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

)

);