Projeto de BD – Parte 2

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Grupo 201 – Turno L18

Aluno	Esforço (horas)
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Modelo Relacional

ivm(serialnumber,manuf)

point_of_retail(name,address)

installed_at(serialnumber,manuf,address,nr)
- serialnumber,manuf: FK(ivm)
- address: FK(point_of_retail)

retailer(TIN,retailer_name)
- UNIQUE(retailer_name)

category(name)
- IC-1: name must exist in Super_category or Simple_category
- IC-2: No category can exist at the same time in Super_category and Simple_category

responsible_for(serialnumber,manuf,TIN,name)
- serialnumber,manuf : FK(ivm)
- TIN: FK(retailer)
- name: FK(category.name)

simple_category(name)
- name: FK(category.name)

super_category(name)
- name: FK(category.name)
- IC-3: Every Super_category (name) must participate in the Has_other association.

has_other(super_name,category_name)
- super_name: FK(super_category.name)
- category_name: FK(category.name)
- IC-4: super_name is always different from category_name
- IC-5: it cannot exist cycles in Category hierachies

shelf(nr,serialnumber,manuf,height)
- serialnumber,manuf: FK(ivm)
- IC-6: Every Shelf (nr,serialnumber,manuf) must participate in the Displayed association
- IC-7: nr,serialnumber,manuf must exist in Ambient_temp_shelf, Warm_shelf or Cold_shelf
- IC-8: nr,serialnumber,manuf cannot exist at the same time in more than one of the following: Ambient_temp_shelf, Warm_shelf and Cold_shelf

ambient_temp_shelf(<u>nr,serialnumber,manuf</u>)
- nr,serialnumber,manuf: FK(shelf)

warm_shelf(<u>nr,serialnumber,manuf</u>)
- nr,serialnumber,manuf: FK(shelf)

cold_shelf(<u>nr,serialnumber,manuf</u>)
- nr,serialnumber,manuf: FK(shelf)

product(<u>ean</u>,descr)
- IC-9: Every Product (ean) must participate in the Has association

planogram(<u>ean,nr,serialnumber,manuf</u>,faces,units,loc)
- nr,serialnumber,manuf: FK(shelf)
- ean: FK(product)

has(<u>ean,name</u>)
- ean: FK(product)
- name: FK(category.name)

displayed(<u>nr,serialnumber,manuf</u>,name)
- nr,serialnumber,manuf: FK(shelf)
- name: FK(category.name)

replenishment_event(<u>ean,nr,serialnumber,manuf,instant</u>,units)
- ean,nr,serialnumber,manuf: FK(planogram)
- IC-10: Every ReplenishmentEvent (ean,nr,serialnumber,manuf,instant) must participate in the replenisher_of association
- IC-11: units cannot exceed the number of unites specified in Planogram(ean,nr,serialnumber,manuf)

replenisher_of(TIN, <u>ean,nr,serialnumber,manuf,instant</u>)
- ean,nr,serialnumber,manuf,instant : FK(replenishment_event)
- TIN: FK(retailer)

IC-12: A Product can only be replenished on shelf where its Category is displayed.
IC-13: A Product can only be replaced by the Retailer responsible for the product category in that IVM.

Note: Notice that Shelf that has a single Category and that Replenishment_Event has a single Retailer. Instead of Category, Retailer being an attribute of Shelf and Replenishment_Event respectively, we chose to create the relations Displayed, Replenisher_of in order to make it easier for possible changes in both restrictions in the future.

Álgebra Relacional

1. Listing all the products that in a single replenishment action after "2021/12/31" had more than 10 units replenished, and not the products whose sum of units in the several replenishment events is greater than 10 (by Slack).

$$D \leftarrow \pi_{ean}(\sigma_{instant>2021\ /12\ /31\ \wedge\ units>10}\ (\text{replenishment\_event}))$$

$$C \leftarrow \pi_{ean}(\sigma_{name="Barras\ Energéticas"}(\text{has}))$$

$$\pi_{ean,descr}((D \wedge C) \bowtie product)$$

2.

$$\pi_{serialnumber,manuf}(\sigma_{ean=\ 9002490100070}(\text{planogram}))$$

3.

$$G_{COUNT(\ )}(\sigma_{super\_name="Sopas\ Take-Away"}(has_{other}))$$

4.

$$D \leftarrow ean G_{SUM(units)\rightarrow units,COUNT()\rightarrow count}(replenishment\_event)$$

.1) Most replenished product in number of total units in all its Replenishment Events

$$C \leftarrow G_{MAX(units)\rightarrow max\_units}(D)$$

$$T \leftarrow \pi_{ean}(\sigma_{units=max\_units}(D \times C))$$

.2) Most replenished product in number of replacements:

$$C \leftarrow G_{MAX(count)\rightarrow max\_count}(D)$$
$$T \leftarrow \pi_{ean}(\sigma_{count=max\_count}(D \times C))$$

Final answer for both cases:

$$\pi_{ean,descr}(T \bowtie product)$$

1.
SELECT *
FROM product
WHERE ean *IN (*
        (SELECT DISTINCT ean *FROM* replenishment_event *WHERE* instant
        > "2021/12/31" *AND* units > 10 *)*
    INTERSECT
        (SELECT ean *FROM* has *WHERE* name = "Barras Energéticas"*)*
)

2.
SELECT DISTINCT serialnumber,manuf
FROM planogram
WHERE ean = 9002490100070

3.
SELECT COUNT(*)
FROM has_other
WHERE super_name="Sopas Take-away"

4 .1)
SELECT ean,descr
FROM replenishment_event *NATURAL JOIN* product
GROUP BY ean,descr
HAVING SUM(units) >= *ALL*(
    SELECT SUM(units)
    FROM replenishment_event
    GROUP BY ean
)

4 .2)
SELECT ean,descr
FROM replenishment_event *NATURAL JOIN* product
GROUP BY ean,descr
HAVING COUNT(*)>= *ALL*(
    SELECT COUNT(*)
    FROM replenishment_event
    GROUP BY ean
)

Note: In 4.1 and 4.2, the partitions are grouped by ean to select the maximum sum of units/count and then grouped by ean,descr to get to the final answer, because given the fact that ean is unique then ean,descr is also unique.That´s the only reason why the usage of two different columns for GROUP BY in this query is correct. Other option would be to select all eans who surpassed the aggregation condition, and only then by joining to product table to get the final ean,descr answer.