

Bases de Datos

2019/2020

Project Assignment - Part 1

In this Part 1 of the project assignment you will design a database model to answer the information requirements of an application whose domain is presented below. Your job is to deliver a concise and clean data model using the Entity-Association model graphic notation taught in class and along with it identify and specify the appropriate Integrity Constraints.

Domain Description: Supermarket Management

Consider a shelf and product management system of a modern supermarket.

Every **supermarket** has a **name** and an **address**, is designated by its **TIN** (Tax Identification Number). Physically, the supermarket floor is **organised in** corridors. A **corridor** has a **corridor number** that identifies it inside the supermarket and a **width** in meters. Corridors have aisles with shelves.

In a supermarket, products are **displayed on** shelves according to a plan known as the supermarket planogram. The **planogram determines the shelf**, the location (a **slot number**), the **number of visible product fronts** and the **maximum number of units** to be placed on the shelf.

Each **shelf** is identified by the **corridor**, the **side** (left or right) and the **height** (floor, middle, upper).

The **products** are identified by a barcode with 13 numeric digits known as the **EAN Code**, have a **textual designation**.

Products are further **organised into** categories. **Categories** have a **name**. There are no uncategorized products and each product belongs to only one category. There may be categories made up of other categories. That is, the categories form a hierarchy. Categories made up of sub-categories are designated as 'super-categories' and the rest as 'simple-categories'. A category can only belong to at most one 'super-category'. The system must determine, for a super-category, how many sub-categories exist. Each category has a shelf predetermined by the planogram of each supermarket.

Each **product** is **supplied by one or more suppliers** that are identified by their **TIN** (Tax Identification Number). For each product there is a **primary supplier** and there can be only **two secondary suppliers**. Any product must have at least one secondary supplier. A supplier cannot be both primary and secondary for

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the same product. It is necessary to record the **date** on which a supplier became a primary supplier of a given product. It is not necessary to keep the supplier history.



It is necessary to keep the history of the replenishment events of products in shelves according to the planogram.

A **replenishment** event occurs at a given instant and is characterised the **number of units replenished**. The maximum number of units can be replenished on a replenishment event must always be less than those planned in the planogram. → IC

Supermarket employees perform replenishments. An **employee** has also a **TIN** and a **name**. Employees can be classified according to their type of **shift**, which can be a **day shift** or **night shift**. For night shifters, it is necessary to record the compensation value for overtime.

Employees can also be classified according to type of replenishment they can perform. Some employees can perform either a **specific replacement** or a **general replacement**, others can do **both**. Specific replacement employees are organised by further by **speciality** (delicatessen, fishmonger, meat, dairy, etc.). Specialities are not known upfront. Night shift employees can never make a specific replacement. Each employee can have a **'backup' employee** for the general replacement. ↗ IC

Work to be developed

1. Design an **Entity-Association model diagram** for the problem domain presented in the previous section.
2. Identify those situations that are inconsistent in the problem domain but that are allowed in the presented Entity-Association model, and **define a set of Integrity Constraints** that complete the proposed model in order to prohibit situations that are invalid.

Aspects to keep in mind

Please keep in mind the following aspects while developing your work:

- The Entity-Association model must be **expressed** in **the notation taught in class**;
- The Integrity Constraints to the Entity-Association model must be written as **assertions expressed in terms of the concepts Entity-Association model**, that is, in terms of attributes, entities, and relationships between them;
- The **cleanliness** and **conciseness** of the model will be **evaluated**.

Report format and submission

The project assignment will be evaluated based on a report submitted by the students. The report must contain responses to the items requested above.

The following table shows the value of each part of the work to be carried out.

Item	Relative Maximum Grading
Entity Association Model	16/20
Integrity Constraints	4/20

The report should start with a cover page with the title "BD Project - Part 1", with the name and number of students, the relative percent of each student's contribution, together with the total effort (in hours) that each element of the group dedicated to the project, the number of the group, the shift to which the group belongs, and the name of the laboratory teacher.

Length: In addition to the cover sheet, the report shall have a maximum of 2 pages.

The report will have to be submitted in two versions:

- Digital version, in PDF format, with name delivery-01-GG.pdf (where GG is the group number), to be submitted via Fénix System until the delivery date.
- Paper printed version, to be handed to the teacher in the next laboratory shift.