Dedicatoria:
En memoria de nuestra salud mental y de nuestros compañeros Wowawe y Vanacc

BuySellAutomovile_DB

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1. The final title

The final name for the project is “BSA (BuySellAutomovile) DataBase”

2. The context of the problem

• Who is going to use the database?

People, workshops, dealerships, etc.

• What is the database intended for?

To store data about the sale and/or purchase of cars, motorcycles, etc., as well as parts or accessories for them, along with user information and chats between them.

• Is it just for storing information of one company (branch, department, etc.) or it will store information from several ones?

It will store information from several companies.

• Other any contextual information considered by you as important.

Within the products, such as a car, details like mileage, age, components, etc., will be recorded. Additionally, buyers will be able to have a private chat with sellers to seek further information.

3. Data requirements

3.1 “Employee”

• We will identify them through their passport and by generating an employee number.
• Another way to identify them could be through their Social Security card.
• Full name, including last names.
• Employee address.
• We will manage contact details such as the work email, which can also be used for identification since it will be unique for each employee.
• Date of birth, which will help us calculate their age.
• We will store the length of time the employee has been with the company.

3.1.1 “Workshop Employee”

- Effectiveness ratio.

- Employee specialization (engines, electronics, IT, etc.).

3.1.2 “Delivery Employees”

- For these employees, we store the delivery route.
- Driving license.
- We will also store their phone number in case contact is needed regarding the delivery.

3.2 “Products”

- A ZipCode to uniquely identify each product, which will help us manage all sales, purchases, and storage.
- Essential data includes the brand, model, year of manufacture, and type of vehicle or part/accessory.
- A product image uploaded by a user, specifically a main photo that will serve as a thumbnail, with the option to view additional photos on the product page if more are available.
- Price and offers: The price set by the user or agreed upon with different companies will be stored, and during certain periods, discounts will be applied to specific products previously agreed upon.
- We also store its location.

3.2.1 “Automobiles”

- To identify it, we store the license plate.
- We store the vehicle's mileage.
- We store data related to the vehicle's performance, such as fuel consumption, horsepower, range, number of gears, tank capacity, and engine.

3.2.2 “Others”

- In this case, it refers to anything that is not a vehicle; therefore, we store its size to organize its logistics and usage.

3.3 “Users”

- **User ID:** Unique identifier for the user (primary key).
- **Username:** Public name within the application.
- **Email Address:** User's email address.
- **Contact Phone:** User's phone number.
- **Address:** Physical address.

- **Registration Date:** Date when the user registered on the platform.
- **Account Settings:** Account type, search history, password, account status, favorites list, ratings.
- **Favorite Brands:** Allows the search engine to recommend products related to these brands.
- **Average Rating:** Each user, when making purchases or sales, will receive a rating from the other user. These ratings are stored and averaged.

3.4 "Workshops"

For the workshops distributed across different regions, we will need to store the following data:

- **Workshop ID:** The workshop will be identified by the zip code.
- **Address:** We will store the city, postal code, street, and number.
- **Phone Number:** Contact number for calling the workshop.

Regarding the workshop size, we need to store:

- **Size:** The square meters of the workshop and the number of rooms.
- **Inventory:** All the materials inside, including tools and various materials or spare parts

3.5 "ChatBot"

The bot will be responsible for maintaining a chat with users, allowing them to ask questions about the application's functionality, policies, or resources. It will also provide basic advice during times when the specialist is busy or when the user does not require highly personalized or specific assistance. Therefore, we will store the following data:

- **Chat Code:** The identification for each bot along with its chat and user.
- **Version:** The software version the bot is using.
- **Topics:** To track the products users inquire about the most.

3.6 “Transport”

The transportation entity set is responsible for storing data on the types of vehicles that employees handling deliveries will need to use, broken down into National or International.

Therefore, the transports will contain the following data:

- **Packet Number:** A unique identifier for each transport, helping us organize them better.
- **Route and Cost:** We will store the most optimal routes to the destination and the associated cost.
- **Trackers:** We will store the real-time location of the vehicles to notify workshops and users.

It will have two inheritances: one for national and one for international:

3.6.1 “National”

This entity set contains transports dedicated to national deliveries. The following data will be used in this entity set:

- **Regions Covered:** The region where the vehicle is located and operates.
- **License Plate:** To register each vehicle and track which employee is assigned to each one.

3.6.1.1 “Trucks”

Trucks will handle the transportation of cars and will contain the following specific data:

- **Weight Capacity:** The maximum weight the transport can carry.

3.6.1.2 “Vans”

Vans will handle the transportation of parts and accessories and will contain the following specific data:

- **Volume Capacity:** The number of packages that can be transported.

3.6.2 “International”

This entity set is dedicated to international deliveries, carried out by cargo planes or ships, where we will store the following data:

- **Countries Covered**
- **International Licenses:** We need to have licenses allowing transportation between specific countries.

3.7 Contracts

The type of contract, the stipulated salary, the contract start date, and the duration of vacation will be stored.

It will be identified by a unique ID for each contract.

3.8 “Warehouses”

The warehouses will contain the following data:

- **Capacity:** Storing the number of parking spaces and parts.
- **ID_WORKHOUSE:** Given by the zip code of its address.
- **Address:** The warehouse's physical address.

3.9 “Transport Partners”

It is the entity set related to international transport. Its data is as follows:

- **Company Name** (Company names are unique and do not repeat)

3 Functional requirements

1. Product Management

- Register new products with their characteristics, such as type (Automobile, Other) and specific details.
- Categorize products as automobiles or other types, storing relevant information for each category.
- Link products with suppliers and contracts to ensure each product has an associated supplier.
- Update product inventory in warehouses and workshops, and control available quantities.

2. Warehouse and Workshop Management (Warehouse and Workshops)

- Register and manage warehouses where products are stored, including information about location and capacity.
- Manage workshops to oversee product maintenance, including assigned employees and work history.
- Stock control in each warehouse, keeping inventory updated and reflecting product movements between warehouses and workshops.
- Assign products to workshops and warehouses based on repair or storage needs.

3. Employee Management

- Register employees and their personal data, such as name, role, and contract status.
- Assign employees to different workshops and warehouses, reflecting their responsibilities at each workplace.
- Control employee contracts and manage labor relations (CONTR_EMP) detailing the type and duration of the contract.
- Track employees in deliveries to manage assignments of deliveries to specific employees.

4. Supplier Management

- Register suppliers and their contact information, ensuring each supplier is linked to specific products and contracts.
- Assign contracts to suppliers detailing the types of products they provide and contract terms.
- Link contracts with products to ensure each contract covers a specific set of products in the inventory.

5. Delivery and Transport Management

- Manage product deliveries from warehouses to destinations, specifying transport and assigned employees.
- Register and assign means of transport (Vans, Trucks) for deliveries based on product type and location.
- Control transport partners (Transport Partners) to coordinate international and national shipments, including information about the transport partner.

- Register national and international deliveries and document details of each shipment, including the transporter and vehicles used.

6. Chatbot Interaction

- Integration with the chatbot to answer frequently asked questions from users about products, orders, or inventory availability.
- Support for automated inquiries related to product location, delivery status, and availability of workshops or warehouses.
- Store chatbot conversation history for future analysis or customer support.

7. Contract and Service Management

- Register and manage contracts with suppliers and employees, including details on terms, duration, and conditions.
- Manage services related to products, such as maintenance or warranties, and track them.
- Assign service contracts to employees or suppliers based on the specific product requirements.

8. Reports and Statistics

- Generate inventory reports showing available stock in warehouses and workshops.
- Reports on transport and deliveries detailing the number of products delivered, delivery times, and vehicle usage.
- Supplier performance analysis based on punctuality and quality of delivered products.
- Workshop usage statistics and maintenance performed, including time spent on each product type.

4 Identifying entities, attributes and relationships

A) ENTITY SET

- EMPLOYEES (**EmployeeNumber**, *EmployeePassport*, FullName {FirstName, SecondName}, *SSNumber*, Address {Street, Number, Country, ZipCode, Floor_Num}, *Email*, BirthDate {Birth Month, Birth Day}, Age, Dwell Time, Category.
    - DELIVERIES (Driving License, Phone Number, Driving Route).
    - WORKSHOP (Accuracy Rate, Specialization).

- CHATBOT (**Chat Code**, Version, Topic).
- Contract (**ContractID**, Salary, Sign Date {Sign Month, Sign Year, Sign Day}, Holidays {Holiday Day, Holiday Month, Holiday Year}, Schedule, Star_time, End_time)
- PRODUCTS (**Zip Code**, Price, Brand, Model, Year of Manufacture, Type, Images, Discount/Promotion, Location, Description).
    - AUTOMOBILE (License Plate, Km, Consume, Engine, Horsepower, Number of Gears, Fuel Capacity, Autonomy).
    - Other (Size, Used for).
- *USERS (**UserID**, Username, Email, Phone Number, Adress {Street, Number, Country, ZipCode, floor_num}, Log Date {Log Day, Log Year, Log Month}, Configuration {AccountStatus, AccountType, History, Password}, Favourites_brands, Avg_Ratings).*
- *WORKSHOP (**ZipCode**, Adress {Street, Number, Country}, Size, Phone Number).*
- *WAREHOUSE (**ZipCode**, Volume {Parking slots, number of pieces}, Address {Street, Number, Country).*
- TRANSPORT PARTNER (**Company Name**)
- TRANSPORTS (**Packet Number**, *Localizer*, Route, destination)
    - National (License Plate)
        - TRUCK (Weight_capacity)
        - VAN (Volume_capacity)
    - International (Countries_covered, International_Licenses)

B) RELATIONSHIP SETS

- USEPRO [User with Products] (UserID, Zip Code) (one-to-many).
- PRODELE [Products with Deliveries-Employees] (Mantainment) (Zip Code, Delivery Employee Number) (many-to-one).
- PROWOE [Products with Workshop-Employees] (Zip Code, Workshop Employee Number, Incident) (many-to-one).
- USERTALK [Recursive relationship between two users] (UserID, UserID, Chat) (many-to-many).
- USERPAY [Recursive relationship between two users] (UserID, UserID, Payment, rating_transaction) (many-to-many).
- BOTUSE [User with chatbot] (User ID, Chat Code) (many-to-one).
- WOWAWE [Workshop and Warehouse with Workshop-Employees] (WorkshopID, Warehouse ID, WorkShop Employee Number) (one-to-many).

- PROWOR [Products with Workshop] (Zip Code, WorkshopID) (many-to-one).
- PROWAR [Products with Warehouse] (Zip Code, WorkshopID) (many-to-one).
- DELTRA [Delivery Employee with Transport] (Delivery Employee Numer, Packet Number) (many-to-many)
- TRUAUT [Trucks with Automovile] (Automobile Packet Number with Zip Code) (one-to-many)
- VANOTH [Vans with Other] (Packet Number with Other Zip Code) (one-to-many)
- DELWAR [Deliveries Employees with Warehouses] (Employee Number with Warehouse ID) (many-to-many)
- WORWAR [Workshops with Warehouses] (WorkshopID, WarehouseID) (one-to-many)
- WORUSE [Workshps with Users] (WorkshopID, User ID, Date) (many-to-many)
- BOTWOE [Chatbots with Workshops employee] (Chat Code, Workshop Employee Number) (many-to-one)
- DELUSE [Deliveries Employees with User] (Employee_num,userID, date) (many-to-many)
- INTRAPRO [International Transport with Products] (Inter Packet Number, Zip code) (many-to-one)
- CONTEMP [Contract with Employees] (ID contract, Employee Number) (one-to-one)
- INTTRA [International with TransportPartner] (International Packet Number, Company Name)(one to many)

C) SPECIAL ATTRIBUTES

1. **Composite Atributes**:
    - **Address** in **EMPLOYEES, USERS, WORKSHOPS** *{Street, Number, Country, ZipCode, floor_num},*
    - **Log Date** in **USERS** (Day, Month, Year)
    - **Configuration** in **USERS** *{AccountStatus, AccountType, History, Password},*
    - **Capacity** in **WAREHOUSES** *{Parking slots, number of pieces}*
    - **Sign Date** in **CONTRACTS** (Sign Day, Sign Month, Sign Year)
    - **Holidays** in **CONTRACTS** (Holiday Day, Holiday Month, Holiday **Year)**

- **Name** in **EMPLOYEES** (First Name, Second Name)
- **BIRTH DATE** in **EMPLOYEES** (Birth Day, Birth Month)

2. **Multivaluade Atributes**:

   Topic in **CHATBOT** (A user can talk about many topics, information, tests, etc.)

   Ratings in **USERS** (A user can have several ratings from other users)

   Favourites in **USERS** (A user can have many products marked as favorites)

3. **NULL Atributes**:
   - **Topic** in **CHATBOT**
   - **Phone Number** in **EMPLOYEES**
   - **Age** in **EMPLOYEES**
   - **Delivery Route** in **EMPLOYEES**
   - **Adress** in **EMPLOYEES**
   - **Ratings** in **EMPLOYEES**
   - **Favourites_brands** in **Users**
   - **Search History** in **Users**
   - **Adress** in **Users**
   - **Avg_ratings** in **Users**
   - **Rating_transaction** in **USERPAY**
   - **Route cost** in **Transport**
   - **International Licenses** in **INTERNATIONAL**
   - **Discount** in **PRODUCTS**
   - **Location** in **PRODUCTS**
   - **Imagen** in **PRODUCTS**
   - **Autonomy** in **AUTOMOBILE**
   - **Incident** in **PROWOE**

4. **Derivade Atributes**:
   - **Age** in **EMPLOYEES** (derived from **BirthDate**).

- **Autonomy** in **AUTOMOBILES** (derived from Fuel Capacity and Consume)
- **Dwell Time** in **EMPLOYEES** (derived from Sign Date)
- **Parking Slots y Number of pieces** in **WAREHOUSES** (derived from Inventory)
- **Regions Covered** in **NATIONAL** (derived from Route)
- **Route Cost** in **TRANSPORT** (derived from Route)

5 Ternary Relationship Sets

In this design, we can have a ternary relationship between WorkShops, WareHouse, and Workshop-Employees, so that workshop employees can work in the workshop, but when they need parts or materials to work, they can find them in the warehouse. Additionally, there is a ternary relationship between Products, International, and TransportPartner, such that with the aggregation between international transport and the associated transport company, there is a relationship between this and the products to be delivered, in this case, internationally.

6 Keys

The primary identifiers are those in **bold** in the Entity Set section (Section 4 A), and the candidate identifiers are those in *italics* in the same section.

7 Weak Entities

- Products are a weak entity relative to users, as there are no products without users.
- The warehouse is a weak entity relative to the workshop, as without the workshop, there would be no need for a warehouse to store parts.
- International transport is a weak entity relative to the affiliated transport company, as without an affiliated company, there would be no international transport.

8 Make It International

This design is international, as the buying and selling of vehicles and parts, as well as the offering of services in workshops, is a global activity. Both buyers and sellers can come from different countries, so the system must be able to manage international transactions, including different currencies and payment methods. Additionally, transports can be differentiated between international and national, thus reaching the rest of the world.

9 Workload table

Group 1	FP1	Agree	FP2	Agree	FP3	Agree	FP4	Agree
D.M	46,00%	Y	22,00%	Y	33,00%	Y	30,00%	Y
P.R	27,00%	Y	39,00%	Y	34,00%	Y	40,00%	Y
M.S	27,00%	Y	39,00%	Y	33,00%	Y	30,00%	Y
Comments								
Group 1	FP5	Agree	FP6	Agree	FP7	Agree	FP8	Agree
D.M	36,00%	Y	33,00%	Y	30,00%	Y	30,00%	Y
P.R	27,00%	Y	33,00%	Y	30,00%	Y	30,00%	Y
M.S	37,00%	Y	34,00%	Y	40,00%	Y	40,00%	Y
Comments								
Group 1	FP9	Agree	FP11	Agree	FP12	Agree	FP15	Agree
D.M	40,00%	Y	28,00%	Y	38,00%	Y	33,00%	Y
P.R	40,00%	Y	36,00%	Y	31,00%	Y	33,00%	Y
M.S	20,00%	Y	36,00%	Y	31,00%	Y	34,00%	Y
Comments								