DATA BASE MANAGEMENT

Project outline(translated from Greek)

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Description of the problem

The real estate agency "Kaputnik", which manages properties for rent and sale on behalf of property owners, wants to create a database for managing data related to its operations. During interviews with company executives, the following description (specifications) regarding the company's operation emerged.

'Kaputnik' undertakes the rental and sale of properties on behalf of their owners to various prospective clients. The company specializes in the sale and rental of properties intended for residential or commercial use (such as apartments, maisonettes, detached houses, shops, warehouses, etc.). Each property that the company deals with has a unique code, an address (including street, number, postal code, and city), surface area of the property (i.e., its numerical size expressed in square meters), and the floor it is located on if it is in a multi-story building. Each property also has a suggested selling price and a suggested rental price depending on whether it is available for sale or rent, respectively. These suggested prices are determined by the property owner when they request 'Kaputnik' to sell or rent out the property. A property that is only available for sale does not have a suggested rental price, while a property that is only available for rent does not have a suggested selling price. There may be properties available for both sale and rent, and these have both a suggested selling price and a suggested rental price. The rental price is stated for a one-month period. For each property, the company keeps information about its type: whether it is a maisonette, apartment, detached house, shop, or warehouse. Each property must belong to only one type, while the company may have multiple properties belonging to a specific type.

Each type of property is uniquely characterized by a description (e.g., 'apartment,' 'maisonette,' 'warehouse') and the number of rooms (e.g., 3, 4, 5, etc.). A type such as a 4-room apartment is considered a different type from a 5-room apartment. The description together with the number of rooms is unique for each type of property. The company also employs staff, who are characterized by their name, tax identification number (ΑΦΜ), ID number, residential address, mobile phone number, and office phone number. All properties of 'Kaputnik' must be supervised/managed by its employees. An employee can manage multiple properties, and each property must have at most one employee assigned as its manager. For promoting sales, 'Kaputnik' advertises properties on websites using advertising banners (e.g., on the website patrasevents.gr). An advertisement, concerning a single property, is characterized by the date of its first publication, the duration (in days) of the advertisement, its cost, and also how many users clicked on the advertisement banner. The company also maintains records of the websites where its advertisements are published. Each website is uniquely identified by its URL.

For each website, the following information is also retained: the year the website first appeared, the category to which it belongs (news, sports, fashion, e-shop, miscellaneous, etc.), the cost of advertising in Euros (how much an advertising banner costs), and the number of visitors to the website in the last month. An advertisement for a property can appear on multiple websites, and a website can publish multiple advertisements for different properties of the company.

The owners of the properties for which 'Kaputnik' seeks buyers or tenants may be either individuals (natural persons) or companies. For all owners, the company maintains their Tax Identification Number (ΑΦΜ), their address, and a contact telephone number. For individuals, their ID number and name are also retained, while for companies, their corporate

name and type of company (SA, LLC, LTD, etc.) are retained. An owner may have multiple properties registered with 'Kaputnik,' and for each property, 'Kaputnik' records only one owner.

'Kaputnik' also maintains information about its clients. By 'clients,' the company refers to individuals who are interested in either purchasing or renting a property that the company offers (i.e., prospective buyers/tenants of properties managed by the company). For each client of the company, who can only be an individual, the Tax Identification Number (ΑΦΜ), full name, address, and one or more contact telephone numbers are retained. Clients can visit the properties, and each time, it is recorded which client visited which property, along with the date of the visit. Clients can also declare more than one preference related to the type of properties they wish to either buy or rent (e.g., 2-room apartment, warehouse, etc.). For each buying or renting preference a client may have, a maximum amount they are willing to pay for the property, which is also retained (e.g., a client may indicate a preference for purchasing a 5-room apartment for up to 250,000 Euros or renting a 3-room maisonette with a maximum rent of 900 Euros).

Whenever a property is either rented out or sold to a client, a contract (rental contract, sales contract) is created between the client who made the purchase/rental and the property that was sold or rented. A contract is necessarily associated with only one client, and each sales or rental contract must also be associated with only one property. Each contract has a unique code and a creation date. Rental contracts additionally specify the agreed rental amount (rental price), the start date of the rental, the expiration date of the contract, and the duration of the rental in days. Sales contracts specify the selling price agreed upon with the client, as well as the payment method (for example, 'cash,' 'installment payments,' etc).

Tasks

- 1. Design the Enhanced Entity-Relationship diagram (EER) corresponding to the description of the microcosm of the company 'Kaputnik' provided above, capturing all necessary constraints.
- 2. Convert the Enhanced Entity-Relationship diagram you created in question (1) into the relational model following the methodology taught and present in the notes. Create a database in MS Access (named Kaputnik.mdb) and establish the relationships (tables) corresponding to the relational model of the 'Kaputnik' company's database, capturing all necessary constraints.
- 3. Insert at least 3 instances into each table resulting from step (2).
- 4. In the Access database you have created (Kaputnik.mdb), generate SQL queries that, when executed, correctly respond to the following requests:
  - 1) Find the code, address, floor, area, and city of all properties with an area less than 150 sq.m. and a proposed selling price greater than 50000 Euros.
  - 2) Find the name and all phone numbers of the customers of the company 'Kaputnik' who have visited at least one property located in Patras.
  - 3) Find the code, area, and address of the properties that have been advertised on at least one website.

  - 4) Find the name and mobile phone number of the employee who manages the property with the highest selling price.
  - 5) Find the average selling price of the properties that have been sold and fit the profile of '5-bedroom maisonette' and are located in Athens.
  - 6) Find the code and address of all properties that have been rented.
  - 7) For each customer in the 'Kaputnik' data base, display how many properties they have visited (for each customer, show their name and address).
  - 8) Find the names, tax identification numbers (ΑΦΜ), and addresses of the customers who have neither purchased nor rented properties from 'Kaputnik'.
  - 9) Find the type of property (including description and number of rooms) that has the most purchase preferences from the customers.
  - 10)Find the names and addresses of customers for whom all purchase preferences for property type can be satisfied by the available (unsold or unrented) properties managed by the 'Kaputnik'

- 5. Create a report document containing the SQL queries you created and executed in question 4), along with the results of their execution in table format.