Problem 1

Musicana records have decided to store information on musicians who perform on their albums in a database. The company has wisely chosen to hire you as a database designer.

- Each musician that is recorded at **Musicana** has an ID number, a name, an address (street, city) and a phone number.

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- Each **instrument** that is used in songs recorded at Musicana has a unique name and a musical key (e.g., C, B-flat, E-flat).

- Each **album** that is recorded at the Musicana label has a title, a   and an album identifier.

- Each **song** recorded at Musicana has a unique title and an author.

- Each **musician** may play several **instruments**, and a given instrument may be played by several musicians.

- Each **album** has a number of **songs** on it, song may appear on one album.

- Each **song** is performed by one or more **musicians**, and a musician may perform a number of songs.

- Each **album** has exactly one **musician** who acts as its producer. A producer may produce several albums.

Design a conceptual schema for Musicana. Be sure to indicate all keys and cardinality constraints and any assumptions that you make.

Problem 2

Prepare an E-R diagram for a real estate firm that lists property for sale. The following describes this organization:

- ○ The firm has a number of **sales offices** in several states. Attributes of sales office include Office_Number and Location.

- ○ Each **sales office** is assigned one or more employees. Attributes of **employee** include Employee_ID and Employee_Name. An employee must be assigned to only one sales office.

- ○ For each **sales office,** there is always one **employee** assigned to manage that office.

- ○ The firm lists **property** for sale. Attributes of property include Property_ID and Location (Address, City, State, and Zip_Code).

- ○ Each **property** must be listed with one (and only one) of the **sales offices**. A sales office may have any number of properties listed, or may have no properties listed.

- ○ Each **property** has one or more **owners**. Attributes of owners are Owner_ID and Owner_Name. An owner may own one or more properties. The system stores the percent owned by each owner in each property.

Problem 3

An intermediary car rental company has branches across the city; intended to construct a system to facilitate its transactions. You are asked to build an ER diagram and mapping based on the following information.

- The company has many offices to serve a big sector; each office has an ID, address and a contact no.
- The owner welling to rent his car/s needs to provide the office with data about the full name and national ID and the bank account number to which the company will transfer the money.

- The owner must apply for car renting in only one office.

- Owner can apply for renting one or more cars. In addition, it is not allowed to save a car information that is not related to owner.

- Data about car is ID, model (brand, model name, model year), image of its valid license, the rent value and the car status (if the car is booked, in maintenance or available)

- In regard to the tenant (the person who pays rent for the use of a car); the system has to save information about National ID, valid driving license to secure the car and a mobile number as a contact.

- When a tenant orders a car, some information about this transaction have to be known such as the starting date of renting, duration and payment method.