Business Requirement: Customer Relationship Management (CRM) System Database

1. Overview

Your task is to design and implement a SQL database for a Customer Relationship Management (CRM) system. The CRM system will manage customer data, sales activities, marketing campaigns, and customer support interactions for a large organization. The system must be scalable, efficient, and capable of handling large volumes of data.

2. Key Entities and Relationships

- **Customers**
  - Each customer has a unique ID, first name, last name, email address, phone number, address (including street, city, state, and postal code), and a date of birth.
  - Customers can be individuals or businesses, so there is a need to track the type of customer.
  - A customer may have multiple contacts within their organization (if it's a business), each with a name, title, email, and phone number.
- **Sales Representatives**
  - Each sales rep has a unique ID, first name, last name, email address, phone number, and a region they manage.
  - Sales reps are responsible for managing customer relationships and recording sales activities.
- **Products**
  - Each product has a unique ID, name, description, price, and stock quantity.
  - Products are categorized into different categories, and each category can have multiple products.
- **Sales Orders**
  - Each sales order has a unique ID, order date, status (e.g., pending, completed, canceled), and a total amount.
  - A sales order is associated with a single customer and may include multiple products.
  - For each product in the sales order, track the quantity ordered, the price at the time of the order, and any applicable discount.
- **Marketing Campaigns**
  - Each campaign has a unique ID, name, start date, end date, budget, and description.
  - Campaigns are linked to specific products and target specific customer segments.
  - Track the effectiveness of each campaign by recording the number of new customers acquired, the total revenue generated, and the return on investment (ROI).
- **Customer Interactions**
  - Each interaction has a unique ID, interaction date, interaction type (e.g., phone call, email, meeting), and details of the interaction.
  - Interactions are linked to specific customers and may involve one or more sales reps.
  - Record the outcome of each interaction (e.g., follow-up required, issue resolved, sale made).

3. Functional Requirements

- **Customer Management**
  - Ability to add, update, and delete customer records.

    - Search and filter customers based on various criteria (e.g., name, location, type).
    - View detailed customer profiles, including associated contacts, sales orders, and interaction history.

- **Sales Management**
    - Record new sales orders, update existing orders, and cancel orders if necessary.
    - Generate reports on sales performance, including total sales by region, product, and sales rep.
    - Track sales pipeline and forecast future sales based on historical data.

- **Product Management**
    - Add, update, and delete products and categories.
    - Monitor product inventory levels and set alerts for low stock.
    - Analyze product sales trends and identify top-selling products.

- **Marketing Management**
    - Plan and execute marketing campaigns targeting specific customer segments.
    - Track campaign performance and adjust strategies as needed.
    - Generate reports on campaign effectiveness, including customer acquisition cost and ROI.

- **Customer Support**
    - Log customer interactions and track the status of customer issues.
    - Assign interactions to specific sales reps for follow-up.
    - Generate reports on customer satisfaction and resolution times.

4. Non-Functional Requirements

- **Scalability**: The database should be able to handle millions of customers, sales orders, and interactions without performance degradation.
- **Security**: Implement role-based access control (RBAC) to restrict access to sensitive customer data.
- **Performance**: Optimize queries to ensure quick retrieval of data, especially for large datasets.
- **Backup and Recovery**: Implement a robust backup and recovery plan to prevent data loss.

5. Sample Queries

- List all customers in a specific region.
- Generate a report of total sales by product category for the last quarter.
- Identify customers who have not made a purchase in the last year.
- Track the effectiveness of a specific marketing campaign by analyzing new customer sign-ups and sales revenue.
- View the interaction history of a particular customer, including the sales rep involved and the outcome.

This requirement document provides a comprehensive framework to design and implement a CRM database. Use this to practice creating the database schema, writing SQL queries, and performing various data management tasks.