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**BUEA**

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**FACULTY OF ENGINEERING AND TECHNOLOGY**

**DEPARTMENT OF COMPUTER ENGINEERING**

**COURSE TITLE: ADVANCED DATABASES AND ADMINISTRATION**

**COURSE CODE: CEF 438**

**ADVANCED DATABASE DESING AND ADMINISTRATION CONTINUOUS ASSESSMENT**

# GROUP 6

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1. **PROJECT SCOPE:**

**Project Overview**

The goal of the project is provide realistic experience in the conceptual design, logical design, implementation, operation and maintenance of a small relational database using the DBMS taught in class .

**Description**

The application consists of the operations of a real-estate office. The office needs to keep track of agents, buyers, sellers, properties on the market and recently sold properties. This office focuses on homes rather than business real estate. The management of this real-estate office is not very computer literate. You are being asked to design the database, populate it with sample data and to write several SQL queries to demonstrate the system. The real-estate office is soliciting approximately 50 proposals. To learn more about the application domain look at some real-estate web sites.

1. **INTRODUCTION:**

This report details the design and analysis of a relational database system for a real estate office. The database tracks properties, agents, buyers, sellers, and sales transactions. The design adheres to best practices for data organization and retrieval.

1. **CONCEPTUAL DESIGN**

The conceptual design employs an Entity-Relationship Model (E-R Model) to illustrate the real-world entities and their relationships. The model identifies the following entities:

* **Property:** Represents a house on the market with attributes like address, city, bedrooms, bathrooms, and price.
* **Agent:** Represents a real estate agent with attributes like name, phone number, and email.
* **Buyer:** Represents a person interested in purchasing a property with attributes like name, phone number, and email.
* **Seller:** Represents a person selling a property with attributes like name, phone number, and email.
* **Sale:** Represents a completed property sale with attributes like sale price and date.

The relationships between these entities are defined as follows:

* A Property can be listed by one Agent (One-to-Many).
* A Property can have one Seller (One-to-Many).
* A Property can be sold to one Buyer (One-to-Many).
* A Sale is associated with one Property (One-to-One).
* A Sale is conducted by one Agent (One-to-Many).
* A Sale can have another Agent representing the Buyer (One-to-One).

**Logical Design**

The E-R Model is translated into a relational database schema with normalized tables. Each table represents an entity and includes relevant attributes as columns. Primary and Foreign Keys enforce data integrity and relationships between tables.

* **Property:** (property\_id (PK), address, city, zipcode, bedrooms, bathrooms, sqft, price, image (BLOB), status (For Sale/Sold), school\_district)
* **Agent:** (agent\_id (PK), name, phone, email)
* **Buyer:** (buyer\_id (PK), name, phone, email)
* **Seller:** (seller\_id (PK), name, phone, email)
* **Sale:** (sale\_id (PK), property\_id (FK), buyer\_id (FK), seller\_id (FK), agent\_id (FK), selling\_agent\_id (FK), sale\_price, sale\_date)
  1. **SAMPLE QUERIES IN SQL:**

**a. Find addresses of homes for sale in Bethlehem between 20-25 million CFA:**

SQL

SELECT address

FROM Property

WHERE city = 'Bethlehem'

AND status = 'For Sale'

AND price BETWEEN 20000000 AND 25000000;

**b. Find addresses of homes for sale in Parkland with 4+ bedrooms and no pool:**

SELECT address

FROM Property

WHERE school\_district = '3Parkland3'

AND status = 'For Sale'

AND bedrooms >= 4

AND image IS NULL;

**c. Find the agent who sold the most property in 2020 (total CFA value):**

SELECT name

FROM Agent A

INNER JOIN Sale S ON A.agent\_id = S.agent\_id

WHERE YEAR(sale\_date) = 2020

GROUP BY A.name

ORDER BY SUM(S.sale\_price) DESC

LIMIT 1;

**d. Average selling price and time on market per agent in 2020:**

SELECT A.name, AVG(S.sale\_price), AVG(DATEDIFF(sale\_date, listing\_date)) AS days\_on\_market

FROM Agent A

INNER JOIN Sale S ON A.agent\_id = S.agent\_id

INNER JOIN Property P ON S.property\_id = P.property\_id

WHERE YEAR(sale\_date) = 2020

GROUP BY A.name;

**e. Show a picture of the most expensive house:**

SELECT image

FROM

* 1. **CONCLUSION:**

This report presents a well-designed relational database system for a real estate office. The database structure efficiently stores and organizes data, enabling retrieval through targeted SQL queries. The design principles ensure data integrity and facilitate future expansion as needed.