Fidenz Technologies - Advanced Relational Database Design and Optimization | Level 02

Areas Covered	1. Views 2. Transactions 3. Database security 4. Stored procedures 5. Database functions
Duration	**Learning:** 16h (2 Working Days) **Development:** 8h (1 Working Days)

Instructions:

You are tasked with designing an advanced relational database system for a fictional e-commerce platform called "Shop4All". The database should support the company's operations, including managing products, customers, orders, and inventory. Additionally, you are required to incorporate database views, functions, procedures, database optimization techniques, database security measures, database encoding, and database transactions. Please follow the given requirements and provide a well-structured and optimized database design.

Requirements:

1. Products:
    - Each product has a unique ID, name, description, price, and quantity in stock.
    - Products are categorized into different categories.
    - Each category has a unique ID and name.
2. Customers:
    - Each customer has a unique ID, name, email, and phone number.
    - Customers can have multiple shipping addresses.
    - Each shipping address consists of an ID, street address, city, state/province, postal code, and country.
3. Orders:
    - Each order has a unique ID, order date, and customer ID.
    - An order can contain multiple products, and each product can have a specific quantity in that order.
    - The total price for each order should be calculated based on the individual prices of the products and their quantities.
4. Inventory:
    - The inventory table should track the quantity of each product available.
    - It should include the product ID and the current quantity in stock.

Your deliverables:

1. Logical Entity-Relationship Diagram (ERD) with crow's foot notation:
    - Create an ERD that represents the entities, relationships, and attributes of the database.
    - Clearly indicate primary keys, foreign keys
2. Relational Schema:
    - Based on your ERD, create a relational schema that includes the tables, their attributes, primary keys, foreign keys and constraints (Physical ER)
    - Specify the data types for each attribute.
3. SQL Statements:
    - Write SQL statements to create the necessary tables with the appropriate data types and constraints.
    - Implement the database views, functions, and procedures according to the given requirements.
    - Include sample data for at least two records in each table.

Below things will be taken into consideration when evaluating the assignment:

- Requirement coverage.
- Use of best practices.
- Code quality and style.
- Proper use of available database features and concepts.

Submission Guidelines:

Submit your assignment as a document or PDF file. Include your ERD, relational schema, SQL statements, optimization and security explanations, sample data, encoding techniques, and transaction explanations. Make sure to provide clear and concise explanations, and ensure the readability of your submission.

Note: You can use any relational database management system (RDBMS) of your choice (e.g., MySQL, PostgreSQL, SQL Server) to implement and test your database design.