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College of Engineering and IT
Cybersecurity Dep.

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كلية الهندسة وتقنية المعلومات
قسم الامن السبراني

Database Design for Online Shopping Platform (SHEIN - Beauty Items).

Student : Mayar Al-Saeed
ID: 461210731
Course: CYS131

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Introduction

The objective of this project is to design and implement a robust relational database system for an online shopping platform, specifically modeled after SHEIN's Beauty section. In the modern digital economy, efficient data management is crucial for e-commerce success. This project aims to simulate the backend operations of such a platform by managing critical entities including users, products, orders, categories, and reviews. By analyzing the requirements and establishing relationships between these entities—such as the one-to-many relationship between users and orders —this project demonstrates a comprehensive approach to database design using industry-standard tools and languages.

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Platform Overview: SHEIN (Beauty Items)

Company Background:

SHEIN is a leading global e-commerce marketplace dedicated to providing accessible fashion and lifestyle products. Operating in over 150 countries, the platform is renowned for its on-demand business model and data-driven approach, which allows it to respond rapidly to consumer trends. As a purely digital retailer, SHEIN relies heavily on complex database systems to manage millions of daily users, vast product inventories, and high-frequency transactions, making it an ideal case study for database design and implementation.

Project Scope:

The Beauty Section While SHEIN offers a wide variety of categories including apparel and home goods, this project specifically focuses on modeling the Beauty & Cosmetics division.

- Target Niche:

The database is designed to manage specialized beauty items, structured into major categories such as Skincare, Makeup, Haircare, and Fragrances .

- Operational Goal:

The system aims to simulate the backend operations required to track product details (e.g., price, stock), manage customer orders, and process user reviews efficiently within this specific sector .

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Database Management System: Oracle 19c

For the development and implementation of this project, **Oracle Database 19c** was selected as the Relational Database Management System (RDBMS).

- Why Oracle 19c: Oracle is a market-leading database solution known for its high performance, reliability, and security, making it ideal for handling the transactional nature of an e-commerce platform like SHEIN.
- Usage in Project: This tool was used to create the physical schema of the database, enforce integrity constraints (Primary Keys and Foreign Keys), and manage data relationships defined in the ER Diagram.

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Structured Query Language (SQL)

SQL (Data Query Language) is standard programming language used in this project to communicate with the Oracle database , It serves as the bridge between the database design and the actual data manipulation.

- DDL (Data Definition Language): SQL was used to define the database structure, such as creating tables for Users, Products, and Orders with specific data types (e.g., VARCHAR, DECIMAL, DATE).
- DML (Data Manipulation Language): The project utilizes SQL queries to retrieve specific insights, such as listing all products under the "Skincare" category or calculating average ratings for products using complex subqueries and joins.

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ER Diagram

This diagram illustrates the logical design of the SHEIN Beauty database , It displays the main entities(tables) and how they related to each other to ensure the system works correctly.

- Key components :

Entities : The design includes Users, Products, Orders, Categories, Subcategories and Reviews

- Relationships :

1. Users & Orders : A simplified One to Many relationship, where one user can place multiple orders.
2. Product Hierarchy : Products are organized using Categories and Subcategories to make browsing easier.
3. Feedback : Users can leave multiple Reviews for different products.

This structure allows the database to store customer data, track inventory, and manage sales efficiently.

- **Relationships**

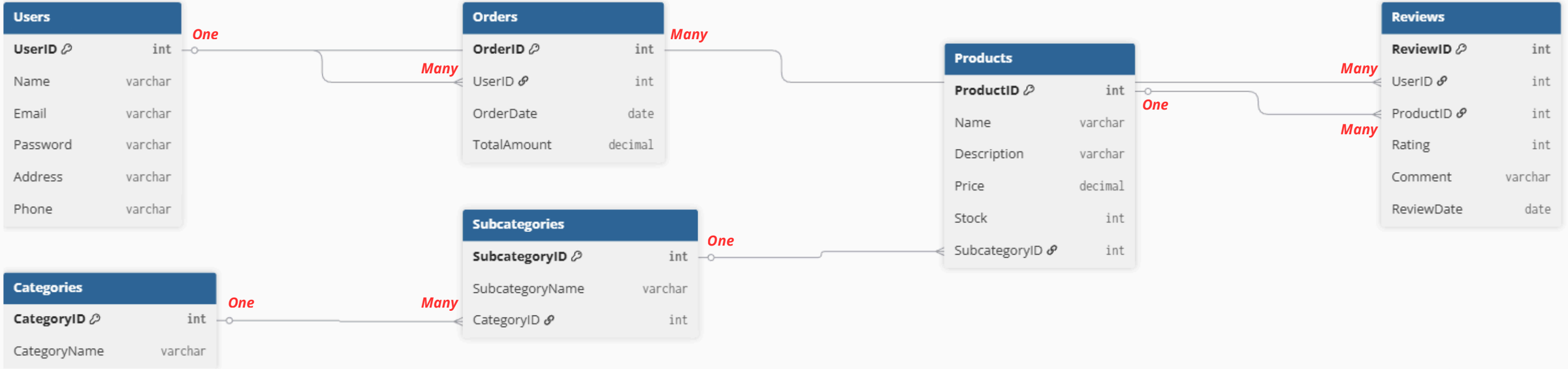
Users → Orders : One to Many.

Orders → Products : Many to Many.

Categories → Subcategories : One to Many.

Subcategories → Products : One to Many.

Users → Reviews : One to Many.


Users
UserID int
Name varchar
Email varchar
Password varchar
Address varchar
Phone varchar
One
Many
Orders
OrderID int
UserID int
OrderDate date
TotalAmount decimal
Many
Products
ProductID int
Name varchar
Description varchar
Price decimal
Stock int
SubcategoryID int
One
Many
Reviews
ReviewID int
UserID int
ProductID int
Rating int
Comment varchar
ReviewDate date
Subcategories
SubcategoryID int
SubcategoryName varchar
CategoryID int
One
Many
Categories
CategoryID int
CategoryName varchar
One
Many
dbdiagram.io

SQL Plus

```
SQL*Plus: Release 23.0.0.0.0 - Production on Wed Dec 10 16:02:14 2025
Version 23.9.0.25.07

Copyright (c) 1982, 2025, Oracle.  All rights reserved.

Enter user-name: sys as sysdba
Enter password:

Connected to:
Oracle Database 23ai Free Release 23.0.0.0.0 - Develop, Learn, and Run for Free
Version 23.9.0.25.07

SQL> create table Users(UserId number(20) primary key, username varchar2(20),emaile varchar2(20),password number(20),adress varchar2(20),phone number(20));

Table created.

SQL> create table categories(categoryid number(20) primary key,CategoryName varchar2(20));

Table created.

SQL> create table subcategories(subcategoryid number(20) primary  key, subcategoryname varchar2(20), categoryid number(20),constraint sub_fk foreign key (ca
tegoryid) references categories(categoryid));

Table created.
```

SQL Plus

```
SQL> create table products(productid number(20) primary key,productname varchar2(20),description varchar2(100),price number(20),stock number(20),Subcategory
id number(20), constraint p_fk foreign key (subcategoryid) references subcategories(subcategoryid));

Table created.

SQL> create table orders(orderid number(20) primary key,orderdate date, totalamount number(20),userid number(20), constraint or_fk foreign key (userid) refe
rences users(userid));

Table created.

SQL> create table reviews(reviewid number(20) primary key,rating number(10),comments varchar2(100),reviewdate date,userid number(20),productid number(20) ,c
onstraint ru_fk foreign key (userid) references users(userid),constraint re_fk foreign key (productid) references products(productid));

Table created.

SQL> INSERT INTO users VALUES (101, 'Saud', 'saufirst@gmail.com', 235687, 'king Fahad road 6', 598927664);

1 row created.
```

```
SQL> INSERT INTO users VALUES (102, 'Danah', 'Danahiuu@gmail.com', 775109, 'king Suliman  road 3', 522588976);

1 row created.
```

SQL Plus

```
SQL> INSERT INTO users VALUES (103, 'Lina', 'Lenamoh@gmail.com', 88907, 'Al-mohammdiah road 9', 53446589);

1 row created.

SQL> INSERT INTO users VALUES (104, 'Salim', 'Salimehero@gmail.com', 432889, 'Al-bostan road 2', 55322756);

1 row created.

SQL> INSERT INTO users VALUES (105, 'Sumaiyah', 'Sumaiam@gmail.com', 432286, 'Al-wafaa road 7', 567892345);

1 row created.

SQL> INSERT INTO categories VALUES (501, 'Skincare');

1 row created.

SQL> INSERT INTO categories VALUES (502, 'Makeup');

1 row created.

SQL> INSERT INTO categories VALUES (503, 'Haircare');

1 row created.

SQL> INSERT INTO categories VALUES (504, 'fragrances');

1 row created.

SQL> INSERT INTO subcategories VALUES (201, 'Cleansers',501);

1 row created.

SQL> INSERT INTO subcategories VALUES (202, 'Lipsticks',502);

1 row created.

SQL> INSERT INTO subcategories VALUES (203, 'Perfumes',504);

1 row created.
```

SQL Plus

```
1 row created.

SQL> INSERT INTO subcategories VALUES (204, 'Mascaras',502);

1 row created.

SQL> INSERT INTO subcategories VALUES (205, 'Treatments',503);

1 row created.

SQL> INSERT INTO subcategories VALUES (206, 'Masks', 501);

1 row created.

SQL> INSERT INTO subcategories VALUES (207, 'Shampoos', 503);

1 row created.

SQL> INSERT INTO subcategories VALUES (208, 'Body Sprays', 504);

1 row created.

SQL> INSERT INTO products VALUES (302, 'matt velvet lipstick','long lasting matte finish',110,95,202);

1 row created.
```

SQL Plus

```
SQL> INSERT INTO products VALUES (303, 'Hydrate cleanser','Moisturizing formula for dry skin',110,86,201);

1 row created.

SQL> INSERT INTO products VALUES (304, 'Hair repair serum','Strenghtens demaged hair',49,233,205);

1 row created.

SQL> INSERT INTO products VALUES (305, 'Golden Musk','Soft musky and vanilla touches',300,50,203);

1 row created.

SQL> INSERT INTO products VALUES (306, 'Curl lift mascara','Long lasting lifting effect',76,66,204);

1 row created.
```

```
SQL> INSERT INTO products VALUES (307, 'Color protect shampo','Protects dyed hair',20,12,207);

1 row created.

SQL> INSERT INTO products VALUES (308, 'Charcoal peel mask','Clears blackheads',17,78,206);

1 row created.
```

```
SQL> INSERT INTO products VALUES (309, 'Citrus burst spray','Fresh lemon and orange',59,37,208);

1 row created.
```

Default

```
SQL> INSERT INTO orders (orderid, userid, orderdate, totalamount) VALUES (1, 101, '20-NOV-25', 450.00);

1 row created.

SQL> INSERT INTO orders (orderid, userid, orderdate, totalamount) VALUES (2, 102, '21-NOV-25', 120.50);

1 row created.

SQL> INSERT INTO orders (orderid, userid, orderdate, totalamount) VALUES (3, 103, '22-NOV-25', 95.00);

1 row created.

SQL> INSERT INTO orders (orderid, userid, orderdate, totalamount) VALUES (4, 104, '23-NOV-25', 300.00);

1 row created.

SQL> INSERT INTO orders (orderid, userid, orderdate, totalamount) VALUES (5, 105, '24-NOV-25', 55.00);

1 row created.
```

```
SQL> INSERT INTO reviews (reviewid, userid, productid, rating, comments, reviewdate) VALUES (1, 101, 302, 5, 'Love the matte finish!', '25-NOV-25');

1 row created.

SQL> INSERT INTO reviews (reviewid, userid, productid, rating, comments, reviewdate) VALUES (2, 102, 305, 4, 'Smells nice but fades fast', '26-NOV-25');

1 row created.

SQL> INSERT INTO reviews (reviewid, userid, productid, rating, comments, reviewdate) VALUES (3, 103, 303, 5, 'Very hydrating for winter', '26-NOV-25');

1 row created.

SQL> INSERT INTO reviews (reviewid, userid, productid, rating, comments, reviewdate) VALUES (4, 104, 306, 3, 'Okay mascara, not the best', '27-NOV-25');

1 row created.

SQL> set linesize 1000;
SQL> select*from users;

    USERID USERNAME            EMAILE                PASSWORD ADRESS                PHONE
---------- ------------------- -------------------- ---------- -------------------- ----------
       101 Saud                saufirst@gmail.com       235687 king Fahad road 6     598927664
       102 Danah               Danahiuu@gmail.com       775109 king Suliman  road 3  522588976
       103 Lina                Lenamoh@gmail.com          88907 Al-mohammdiah road 9   53446589
       104 Salim               Salimehero@gmail.com     432889 Al-bostan road 2       55322756
       105 Sumaiyah            Sumaiam@gmail.com        432286 Al-wafaa road 7       567892345

SQL> select*from categories;

CATEGORYID CATEGORYNAME
---------- --------------------
       501 Skincare
       502 Makeup
       503 Haircare
       504 fragrances

SQL> select*from subcategories;

SUBCATEGORYID SUBCATEGORYNAME      CATEGORYID
```

Default

```
       504 fragrances

SQL> select*from subcategories;

SUBCATEGORYID SUBCATEGORYNAME      CATEGORYID
------------- -------------------- ----------
          201 Cleansers                   501
          202 Lipsticks                   502
          203 Perfumes                    504
          204 Mascaras                    502
          205 Treatments                  503
          206 Masks                       501
          207 Shampoos                    503
          208 Body Sprays                 504

8 rows selected.

SQL> select*from products;

 PRODUCTID PRODUCTNAME          DESCRIPTION                                    PRICE      STOCK SUBCATEGORYID
---------- -------------------- ---------------------------------------------------------------------------- ---------- ---------- -
------------
       302 matt velvet lipstick long lasting matte finish                       110  95          202
       303 Hydrate cleanser     Moisturizing formula for dry skin               110  86          201
       304 Hair repair serum    Strenghtens demaged hair                         49         233          205
       305 Golden Musk          Soft musky and vanilla touches                  300  50          203
       306 Curl lift mascara    Long lasting lifting effect                      76  66          204
       307 Color protect shampo Protects dyed hair                               20  12          207
       308 Charcoal peel mask   Clears blackheads                                17  78          206
       309 Citrus burst spray   Fresh lemon and orange                           59  37          208

8 rows selected.

SQL> select*from orders;

   ORDERID ORDERDATE TOTALAMOUNT     USERID
---------- --------- ----------- ----------
         1 20-NOV-25         450        101
         2 21-NOV-25         121        102
         3 22-NOV-25          95        103
         4 23-NOV-25         300        104
```

```
       304 Hair repair serum    Strenghtens demaged hair                 49        233           205
       305 Golden Musk          Soft musky and vanilla touches          300  50           203
       306 Curl lift mascara    Long lasting lifting effect              76  66           204
       307 Color protect shampo Protects dyed hair                       20  12           207
       308 Charcoal peel mask   Clears blackheads                        17  78           206
       309 Citrus burst spray   Fresh lemon and orange                   59  37           208

8 rows selected.

SQL> select*from orders;

   ORDERID ORDERDATE TOTALAMOUNT     USERID
---------- --------- ----------- ----------
         1 20-NOV-25         450        101
         2 21-NOV-25         121        102
         3 22-NOV-25          95        103
         4 23-NOV-25         300        104
         5 24-NOV-25          55        105

SQL> select*from reviews;

  REVIEWID     RATING COMMENTS                                                                    REVIEWDAT      USERID  PRODUCTID
---------- ---------- ---------------------------------------------------------------------------------------- --------- ---------- ----------
         1          5 Love the matte finish!                                                   25-NOV-25         101        302
         2          4 Smells nice but fades fast                                               26-NOV-25         102        305
         3          5 Very hydrating for winter                                                26-NOV-25         103        303
         4          3 Okay mascara, not the best                                               27-NOV-25         104        306

SQL>
```

```
SQL> SELECT p.PRODUCTNAME, p.Price FROM Products p JOIN Subcategories s ON p.SubcategoryID = s.SubcategoryID JOIN Categories c ON s.CategoryID = c.CategoryI
D WHERE c.CategoryName = 'Skincare';

PRODUCTNAME              PRICE
-------------------- ----------
Hydrate cleanser            110
Charcoal peel mask           17
```

```
SQL> SELECT p.PRODUCTNAME, r.Rating FROM Products p JOIN Reviews r ON p.ProductID = r.ProductID JOIN Subcategories s ON p.SubcategoryID = s.SubcategoryID JO
IN Categories c ON s.CategoryID = c.CategoryID WHERE c.CategoryName = 'Makeup' AND r.Rating > (SELECT AVG(r2.Rating) FROM Reviews r2 JOIN Products p2 ON r2.
ProductID = p2.ProductID JOIN Subcategories s2 ON p2.SubcategoryID = s2.SubcategoryID JOIN Categories c2 ON s2.CategoryID = c2.CategoryID WHERE c2.CategoryN
ame = 'Makeup');

PRODUCTNAME              RATING
-------------------- ----------
matt velvet lipstick          5
```

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Conclusion

In conclusion, this project successfully achieved its objective of designing and implementing a relational database for the SHEIN Beauty Section. By adhering to the database development lifecycle—from requirements analysis to physical implementation using Oracle 19c—we created a robust system capable of managing users, products, orders, and reviews efficiently.

The project demonstrated the practical application of SQL in defining database structures (DDL) and manipulating data (DML) to extract meaningful insights, such as identifying top-rated products. This design not only ensures data integrity but also provides a scalable foundation for future enhancements in an e-commerce environment.