**1. Introduction**

In this stage, primary emphasis will be placed on the Inventory Management System’s backend business logic design using Oracle SQL and PL/SQL. Important activities include creation of tables and sequences, development of business logic using PL/SQL stored procedures, implementation of security measures accessing the system such as password hashing, and creation of exhaustively defined test cases.

**2. Created Tables and Sequences**

**Tables**

Users (UserID, Username, Password, Role)

Products (ProductID, ProductName, CategoryID, SupplierID, QuantityInStock)

Categories (CategoryID, CategoryName)

Suppliers (SupplierID, SupplierName, ContactInfo)

Transactions (TransactionID, ProductID, Quantity, TransactionType, TransactionDate, UserID)

**Sequences**

Users\_seq → For UserID

Products\_seq → For ProductID

Categories\_seq → For CategoryID

Suppliers\_seq → For SupplierID

Transactions\_seq → For TransactionID

**3. PL/SQL Stored Procedures Created**

**Procedure Name**----------->Description

**AddProduct------------------**>Inserts a new product into the Products table using Products\_seq.NEXTVAL

**UpdateProduct--------------**>Updates details of a product using its ProductID

**DeleteProduct---------------**>Removes a product from Products using its ID

**RecordTransaction---------**>Inserts a stock-in or stock-out transaction and updates stock quantity

**GenerateLowStockReport--------**>Lists products in Products where QuantityInStock is less than a threshold

**4. Security Features**

Password Hashing

Using HashPassword with DBMS\_CRYPTO.HASH() and SHA-256.

Stored Password column in Users is a RAW hash, not plaintext.

**Login Verification**

*VerifyLogin* compares hashed input password with stored hash in the Users table.

Prevents unauthorized access.

Access Control

Optional GRANT statements to limit which roles can execute procedures.

*Example: GRANT EXECUTE ON AddProduct TO inventory\_admin;*

**5. Test Cases**

**Test Case DESCRIPTION**

TC01 Add a product (Laptop) to Products

TC02 Update Laptop to Gaming Laptop

TC03 Record stock IN transaction for Laptop

TC04 Record stock OUT transaction for Laptop

TC05 Remove product by ID

TC06 Fetch low stock report for QuantityInStock < 10

TC07 Log in with correct password (Expect: Success)

TC08 Log in with wrong password (Expect: Fail)

*Test outputs verified with DBMS\_OUTPUT.PUT\_LINE.*

**6. Challenges and Solutions**

***IssueResolution***

**ORA-02289 (sequence does not exist)**------------Sequences created first prior to calling in procedures

**Compilation errors in procedures----------**Rectified table and column references to real structure

**Password storage issues----------**Implemented SHA-256 hashing to prevent plaintext storage

**7. Conclusion**

All backend operations are completed and operational as planned:

Sequences and tables are formed

Core procedures function properly

Secure login logic is functional

Test cases validate the strength of business logic

This stage creates the backend framework of a potential user interface (web or mobile).