**Problem Statement 1: Build Command-Line Product Management Application**

Create a Product Management application which provides 6 operations to the user

Following are the operations,

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

Create product table in productdb database forthis application, following are the attributes of product

table,

• Product Id: primarykey

• Product Name

• Product Price

Your application should do the following,

1. Use MySQL / Oracle Database Server to store the product data.

2. You need toget input from console using I/O.

3. Use JDBC API for the CRUD operations using PreparedStatement

**// com.mphasis.domain package is created. Product class is created in this package which holds the data**

**package** com.mphasis.domain;

**public** **class** Product {

**private** **int** productId;

**private** String productName;

**private** **double** productPrice;

**public** Product(**int** productId, String productName, **double** productPrice) {

**this**.productId = productId;

**this**.productName = productName;

**this**.productPrice = productPrice;

}

**public** **int** getProductId() {

**return** productId;

}

**public** **void** setProductId(**int** productId) {

**this**.productId = productId;

}

**public** String getProductName() {

**return** productName;

}

**public** **void** setProductName(String productName) {

**this**.productName = productName;

}

**public** **double** getProductPrice() {

**return** productPrice;

}

**public** **void** setProductPrice(**double** productPrice) {

**this**.productPrice = productPrice;

}

@Override

**public** String toString() {

**return** "Product ID: " + productId + ", Product Name: " + productName + ", Product Price: " + productPrice;

}

}

**//Created a class called ProductManagementDAO with methods which will interact with the database.**

**package** com.mphasis.dao;

**import** com.mphasis.domain.Product;

**import** com.mphasis.dbutil.DBUtil;

**import** java.sql.\*;

**import** java.util.ArrayList;

**import** java.util.List;

**public** **class** ProductManagementDAO {

**public** List<Product> viewProducts() **throws** SQLException {

List<Product> products = **new** ArrayList<>();

String query = "SELECT \* FROM product";

**try** (Connection connection = DBUtil.*getConnection*();

Statement stmt = connection.createStatement();

ResultSet rs = stmt.executeQuery(query)) {

**while** (rs.next()) {

Product product = **new** Product(rs.getInt("Productid"),

rs.getString("Product\_name"),

rs.getDouble("Product\_price"));

products.add(product);

}

}

**return** products;

}

**public** **void** addProduct(Product product) **throws** SQLException {

String sql = "INSERT INTO product (Productid, Product\_name, Product\_price) VALUES (?, ?, ?)";

**try** (Connection connection = DBUtil.*getConnection*();

PreparedStatement statement = connection.prepareStatement(sql)) {

statement.setInt(1, product.getProductId()); // Manually set the productId

statement.setString(2, product.getProductName());

statement.setDouble(3, product.getProductPrice());

statement.executeUpdate();

}

}

**public** **void** updateProduct(Product product) **throws** SQLException {

String query = "UPDATE product SET product\_name = ?, product\_price = ? WHERE Productid = ?";

**try** (Connection connection = DBUtil.*getConnection*();

PreparedStatement pstmt = connection.prepareStatement(query)) {

pstmt.setString(1, product.getProductName());

pstmt.setDouble(2, product.getProductPrice());

pstmt.setInt(3, product.getProductId());

pstmt.executeUpdate();

}

}

**public** **void** deleteProduct(**int** productId) **throws** SQLException {

String query = "DELETE FROM product WHERE Productid = ?";

**try** (Connection connection = DBUtil.*getConnection*();

PreparedStatement pstmt = connection.prepareStatement(query)) {

pstmt.setInt(1, productId);

pstmt.executeUpdate();

}

}

**public** Product searchProduct(**int** productId) **throws** SQLException {

String query = "SELECT \* FROM product WHERE Productid = ?";

**try** (Connection connection = DBUtil.*getConnection*();

PreparedStatement pstmt = connection.prepareStatement(query)) {

pstmt.setInt(1, productId);

ResultSet rs = pstmt.executeQuery();

**if** (rs.next()) {

**return** **new** Product(rs.getInt("Productid"),

rs.getString("Product\_name"),

rs.getDouble("Product\_price"));

}

}

**return** **null**;

}

}

**package** com.mphasis.app;

**import** com.mphasis.dao.ProductManagementDAO;

**import** com.mphasis.domain.Product;

**import** java.sql.SQLException;

**import** java.util.List;

**import** java.util.Scanner;

**public** **class** productManagementApp {

**private** **static** **final** Scanner ***scanner*** = **new** Scanner(System.***in***);

**private** **static** **final** ProductManagementDAO ***dao*** = **new** ProductManagementDAO();

**public** **static** **void** main(String[] args) {

**while** (**true**) {

System.***out***.println("\nProduct Management Application");

System.***out***.println("A. View Products");

System.***out***.println("B. Add Product");

System.***out***.println("C. Update Product");

System.***out***.println("D. Delete Product");

System.***out***.println("E. Search Product");

System.***out***.println("F. Exit");

System.***out***.println("================================");

System.***out***.println("enter an option:");

System.***out***.println("================================");

String choice = ***scanner***.nextLine().toUpperCase();

**switch** (choice) {

**case** "A":

*viewProducts*();

**break**;

**case** "B":

*addProduct*();

**break**;

**case** "C":

*updateProduct*();

**break**;

**case** "D":

*deleteProduct*();

**break**;

**case** "E":

*searchProduct*();

**break**;

**case** "F":

System.***out***.println("Exiting...");

**return**;

**default**:

System.***out***.println("Invalid choice. Please try again.");

}

}

}

**private** **static** **void** viewProducts() {

**try** {

List<Product> products = ***dao***.viewProducts();

products.forEach(System.***out***::println);

} **catch** (SQLException e) {

System.***out***.println("Error while viewing products: " + e.getMessage());

}

}

**private** **static** **void** addProduct() {

System.***out***.print("Enter product ID: ");

**int** id = ***scanner***.nextInt();

***scanner***.nextLine();

System.***out***.print("Enter product name: ");

String name = ***scanner***.nextLine();

System.***out***.print("Enter product price: ");

**double** price = ***scanner***.nextDouble();

***scanner***.nextLine();

Product product = **new** Product(id, name, price);

**try** {

***dao***.addProduct(product);

System.***out***.println("Product added successfully.");

} **catch** (SQLException e) {

System.***out***.println("Error while adding product: " + e.getMessage());

}

}

**private** **static** **void** updateProduct() {

System.***out***.print("Enter product ID to update: ");

**int** id = ***scanner***.nextInt();

***scanner***.nextLine();

**try** {

Product product = ***dao***.searchProduct(id);

**if** (product != **null**) {

System.***out***.print("Enter new product name: ");

String name = ***scanner***.nextLine();

System.***out***.print("Enter new product price: ");

**double** price = ***scanner***.nextDouble();

***scanner***.nextLine();

product.setProductName(name);

product.setProductPrice(price);

***dao***.updateProduct(product);

System.***out***.println("Product updated successfully.");

} **else** {

System.***out***.println("Product not found.");

}

} **catch** (SQLException e) {

System.***out***.println("Error while updating product: " + e.getMessage());

}

}

**private** **static** **void** deleteProduct() {

System.***out***.print("Enter product ID to delete: ");

**int** id = ***scanner***.nextInt();

***scanner***.nextLine();

**try** {

***dao***.deleteProduct(id);

System.***out***.println("Product deleted successfully.");

} **catch** (SQLException e) {

System.***out***.println("Error while deleting product: " + e.getMessage());

}

}

**private** **static** **void** searchProduct() {

System.***out***.print("Enter product ID to search: ");

**int** id = ***scanner***.nextInt();

***scanner***.nextLine();

**try** {

Product product = ***dao***.searchProduct(id);

**if** (product != **null**) {

System.***out***.println("Product found: " + product);

} **else** {

System.***out***.println("Product not found.");

}

} **catch** (SQLException e) {

System.***out***.println("Error while searching product: " + e.getMessage());

}

}

}

**//Initially created a database and table in that database to perform CRUD operations**

mysql> create database productdb;

Query OK, 1 row affected (0.06 sec)

mysql> use productdb;

Database changed

mysql> create table product(Productid int PRIMARY KEY, Product\_name varchar(150),Product\_price double);

Query OK, 0 rows affected (0.58 sec)

**//Created database connection class in another package called com.mphasis.dbutil**

**package** com.mphasis.dbutil;

**import** java.sql.Connection;

**import** java.sql.DriverManager;

**import** java.sql.SQLException;

**public** **class** DBUtil {

**private** **static** **final** String ***DB\_URL*** = "jdbc:mysql://localhost:3306/productdb";

**private** **static** **final** String ***USER*** = "root";

**private** **static** **final** String ***PASSWORD*** = "Password@12";

**public** **static** Connection getConnection() **throws** SQLException {

**try** {

Class.*forName*("com.mysql.cj.jdbc.Driver");

**return** DriverManager.*getConnection*(***DB\_URL***, ***USER***, ***PASSWORD***);

} **catch** (Exception e) {

e.printStackTrace();

**throw** **new** SQLException("Database connection failed.");

}

}

}

**Output:**

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

A

Product ID: 1, Product Name: OIL, Product Price: 180.0

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

B

Enter product ID: 2

Enter product name: MOBILE

Enter product price: 5000

Product added successfully.

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

B

Enter product ID: 3

Enter product name: LAPTOP

Enter product price: 10000

Product added successfully.

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

C

Enter product ID to update: 1

Enter new product name: CAMERA

Enter new product price: 7000

Product updated successfully.

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

A

Product ID: 1, Product Name: CAMERA, Product Price: 7000.0

Product ID: 2, Product Name: MOBILE, Product Price: 5000.0

Product ID: 3, Product Name: LAPTOP, Product Price: 10000.0

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

D

Enter product ID to delete: 2

Product deleted successfully.

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

E

Enter product ID to search: 3

Product found: Product ID: 3, Product Name: LAPTOP, Product Price: 10000.0

Product Management Application

A. View Products

B. Add Product

C. Update Product

D. Delete Product

E. Search Product

F. Exit

================================

enter an option:

================================

F

Exiting...