

Rajalakshmi Engineering College

Name: janane jaipratha

Email: 241501072@rajalakshmi.edu.in

Roll no: 241501072

Phone: 7548851756

Branch: REC

Department: AI & ML - Section 2

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2024_28_III_OOPS Using Java Lab

REC_2028_OOPS using Java_Week 11

Attempt : 1

Total Mark : 20

Marks Obtained : 20

Section 1 : Project

1. Problem Statement

Create a JDBC-based Inventory Management System that handles runtime input to manage items in an inventory. The system should allow users to:

Add a new item (item ID, name, quantity, price).

Restock an item by increasing its quantity.

Reduce the stock of an item, ensuring sufficient quantity.

Display all items in the inventory in a sorted order by item ID.

Exit the application.

Half of the code is given here; Only the remaining part should be completed.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri_db

USER: test

PWD: test123

The items table has already been created with the following structure:

Table Name: items

Input Format

The first line of input consists of an integer choice, representing the operation to be performed (1 for Add Item, 2 for Restock item, 3 for reduce item, 4 for Display, 5 for Exit).

For choice 1 (Add Item):

- The second line consists of an integer item_id.
- The third line consists of a string name.
- The fourth line consists of an integer quantity.
- The fifth line consists of a double price.

For choice 2 (Restock Item):

- The second line consists of an integer item_id.
- The third line consists of an integer quantity_to_add (must be positive).

For choice 3 (Reduce Stock):

- The second line consists of an integer item_id.
- The third line consists of an integer quantity_to_remove (must be positive).

For choice 4 (Display Inventory):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

Output Format

For choice 1 (Add Item):

- Print "Item added successfully" if the item was added.
- Print "Failed to add item." if the insertion failed.

For choice 2 (Restock Item):

- Print "Item restocked successfully" if the restock was successful.
- Print "Item not found." if the specified item ID does not exist.

For choice 3 (Reduce Stock):

- Print "Stock reduced successfully" if the stock reduction was successful.
- Print "Not enough stock to remove." if there is insufficient quantity.
- Print "Item not found." if the specified item ID does not exist.

For choice 4 (Display Inventory):

- Display each item on a new line in the format:
- ID | Name | Quantity | Price
- If no items are available, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Inventory Management System."

For invalid input:

- Print "Invalid choice. Please try again."

Sample Test Case

Input: 1

101

Laptop

50

1200.00
4
5
Output: Item added successfully
ID | Name | Quantity | Price
101 | Laptop | 50 | 1200.00
Exiting Inventory Management System.

Answer

```
import java.sql.*;  
import java.util.Scanner;  
  
class InventoryManagementSystem {  
    public static void main(String[] args) {  
        try (Connection conn = DriverManager.getConnection("jdbc:mysql://  
localhost/ri_db", "test", "test123");  
        Scanner scanner = new Scanner(System.in)) {  
  
            boolean running = true;  
  
            while (running) {  
  
                int choice = scanner.nextInt();  
  
                switch (choice) {  
                    case 1:  
                        addItem(conn, scanner);  
                        break;  
                    case 2:  
                        restockItem(conn, scanner);  
                        break;  
                    case 3:  
                        reduceStock(conn, scanner);  
                        break;  
                    case 4:  
                        displayInventory(conn);  
                        break;  
                    case 5:  
                        System.out.println("Exiting Inventory Management System.");  
                        running = false;  
                        break;  
                    default:  
                }  
            }  
        }  
    }  
}
```

```
        System.out.println("Invalid choice. Please try again.");
    }
}
} catch (SQLException e) {
    e.printStackTrace();
}
}

public static void addItem(Connection conn, Scanner scanner) {
try {
    int id = scanner.nextInt();
    scanner.nextLine();
    String name = scanner.nextLine();
    int quantity = scanner.nextInt();
    double price = scanner.nextDouble();

    String sql = "INSERT INTO items (item_id, name, quantity, price) VALUES
(?, ?, ?, ?)";
    PreparedStatement ps = conn.prepareStatement(sql);
    ps.setInt(1, id);
    ps.setString(2, name);
    ps.setInt(3, quantity);
    ps.setDouble(4, price);

    int rows = ps.executeUpdate();
    if (rows > 0)
        System.out.println("Item added successfully");
    else
        System.out.println("Failed to add item.");

} catch (SQLException e) {
    System.out.println("Failed to add item.");
}
}

public static void restockItem(Connection conn, Scanner scanner) {
try {
    int id = scanner.nextInt();
    int qtyAdd = scanner.nextInt();

    String checkSql = "SELECT quantity FROM items WHERE item_id = ?";
    PreparedStatement checkPs = conn.prepareStatement(checkSql);
    checkPs.setInt(1, id);
```

```
ResultSet rs = checkPs.executeQuery();

    if (!rs.next()) {
        System.out.println("Item not found.");
        return;
    }

    String updateSql = "UPDATE items SET quantity = quantity + ? WHERE
item_id = ?";
    PreparedStatement updatePs = conn.prepareStatement(updateSql);
    updatePs.setInt(1, qtyAdd);
    updatePs.setInt(2, id);
    updatePs.executeUpdate();

    System.out.println("Item restocked successfully");

} catch (SQLException e) {
    System.out.println("Item not found.");
}
}

public static void reduceStock(Connection conn, Scanner scanner) {
    try {
        int id = scanner.nextInt();
        int qtyRemove = scanner.nextInt();

        String checkSql = "SELECT quantity FROM items WHERE item_id = ?";
        PreparedStatement ps = conn.prepareStatement(checkSql);
        ps.setInt(1, id);
        ResultSet rs = ps.executeQuery();

        if (!rs.next()) {
            System.out.println("Item not found.");
            return;
        }

        int currentQty = rs.getInt("quantity");

        if (currentQty < qtyRemove) {
            System.out.println("Not enough stock to remove.");
            return;
        }
    }
}
```

```

        String updateSql = "UPDATE items SET quantity = quantity - ? WHERE
item_id = ?";
        PreparedStatement updatePs = conn.prepareStatement(updateSql);
        updatePs.setInt(1, qtyRemove);
        updatePs.setInt(2, id);
        updatePs.executeUpdate();

        System.out.println("Stock reduced successfully");

    } catch (SQLException e) {
        System.out.println("Item not found.");
    }
}

public static void displayInventory(Connection conn) {
try {
    String sql = "SELECT * FROM items ORDER BY item_id";
    Statement stmt = conn.createStatement();
    ResultSet rs = stmt.executeQuery(sql);

    System.out.println("ID | Name | Quantity | Price");

    while (rs.next()) {
        System.out.println(
            rs.getInt("item_id") + " | " +
            rs.getString("name") + " | " +
            rs.getInt("quantity") + " | " +
            String.format("%.2f", rs.getDouble("price"))
        );
    }
} catch (SQLException e) {
    e.printStackTrace();
}
}
}

```

Status : Correct

Marks : 10/10

2. Problem Statement

In Café Central, the menu is cataloged and stored in a database.

To efficiently manage the restaurant's menu using Java and JDBC, you must build a Restaurant Management System that supports:

Adding new menu items

Updating menu item prices

Viewing details of a menu item

Displaying all menu items in sorted order

You are given two files:

File 1: MenuItem.java (POJO Class)

This class represents the MenuItem entity.

A MenuItem contains the following details:

Field Description

itemId Unique Menu Item ID (Integer)

name Item Name (String)

category Item Category (String)

price Item Price (Double)

Students must write code in the marked area:

```
class MenuItem {  
    private int itemId;  
    private String name;  
    private String category;  
    private double price;  
  
    public MenuItem() {}  
  
    public MenuItem(int itemId, String name, String category, double price) {
```

```
// write your code here  
}  
  
// Include getters and setters  
}
```

Expected in this part:

Assign parameter values to instance variables inside the constructor.

Add getters and setters for all attributes.

File 2: MenuItemDAO.java (Data Access Layer)

This class handles all database operations using JDBC.

Students must complete the missing JDBC logic in the following methods:

```
class MenuItemDAO {
```

```
    public void addMenuItem(Connection conn, MenuItem menuItem)  
throws SQLException {
```

// write your code here

```
}
```

```
    public void updateItemPrice(Connection conn, int itemId, double  
newPrice) throws SQLException {
```

// write your code here

```
}
```

```
    public void deleteMenuItem(Connection conn, int itemId) throws  
SQLException {
```

// write your code here

```
}
```

```
    public MenuItem viewItemDetails(Connection conn, int itemId) throws
```

```
SQLException {  
    // write your code here  
}  
  
public List<MenuItem> displayAllMenuItems(Connection conn) throws  
SQLException {  
    // write your code here  
}  
  
private MenuItem mapToMenuItem(ResultSet rs) throws SQLException {  
    return new MenuItem(  
        // write your code here  
    );  
}  
}
```

Expected in this part:

Write SQL queries for INSERT, UPDATE, DELETE, SELECT.

Execute queries using PreparedStatement or Statement.

Map ResultSet rows to MenuItem objects using mapToMenuItem().

Return a List<MenuItem> where required.

The system should connect to a MySQL database using the following default credentials:

DB URL: jdbc:mysql://localhost/ri_db

USER: test

PWD: test123

The menu table has already been created with the following structure:

Table Name: menu

Input Format

The first line of input consists of an integer choice, representing the operation to be performed (1 for Add Item, 2 for Restock item, 3 for reduce item, 4 for Display, 5 for Exit).

For choice 1 (Add Menu Item):

- The second line consists of an integer item_id.
- The third line consists of a string name.
- The fourth line consists of a string category.
- The fifth line consists of a double price.

For choice 2 (Update Item Price):

- The second line consists of an integer item_id.
- The third line consists of a double new_price.

For choice 3 (View Item Details):

- The second line consists of an integer item_id.

For choice 4 (Display All Menu Items):

- No additional inputs are required.

For choice 5 (Exit):

- No additional inputs are required.

Output Format

For choice 1 (Add Menu Item):

- Print "Menu item added successfully" if the item was added.
- Print "Failed to add item." if the insertion failed.

For choice 2 (Update Item Price):

- Print "Item price updated successfully" if the price update was successful.

- Print "Item not found." if the specified item ID does not exist.

For choice 3 (View Item Details):

- Display the item details in the format:
- ID: [item_id] | Name: [name] | Category: [category] | Price: [price]
- Print "Item not found." if the specified item ID does not exist.

For choice 4 (Display All Menu Items):

- Display each item on a new line in the format:
- ID | Name | Category | Price
- If no items are available, print nothing (or handle with an appropriate message if desired).

For choice 5 (Exit):

- Print "Exiting Restaurant Management System."

For invalid input:

- Print "Invalid choice. Please try again."

Sample Test Case

Input: 1

11

Margherita Pizza

Main Course

12.99

4

5

Output: Menu item added successfully

ID | Name | Category | Price

11 | Margherita Pizza | Main Course | 12.99

Exiting Restaurant Management System.

Answer

```
import java.sql.*;  
import java.util.Scanner;  
  
class RestaurantManagementSystem {  
    public static void main(String[] args) {
```

```
try (Connection conn = DriverManager.getConnection("jdbc:mysql://localhost/ri_db", "test", "test123");
Scanner scanner = new Scanner(System.in)) {

    boolean running = true;

    while (running) {
        int choice = scanner.nextInt();

        switch (choice) {
            case 1:
                addMenuItem(conn, scanner);
                break;
            case 2:
                updateItemPrice(conn, scanner);
                break;
            case 3:
                viewItemDetails(conn, scanner);
                break;
            case 4:
                displayAllMenuItems(conn);
                break;
            case 5:
                System.out.println("Exiting Restaurant Management System.");
                running = false;
                break;
            default:
                System.out.println("Invalid choice. Please try again.");
        }
    }

} catch (SQLException e) {
    e.printStackTrace();
}

}

// You are using Java
public static void addMenuItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    scanner.nextLine();
    String name = scanner.nextLine();
    String category = scanner.nextLine();
    double price = scanner.nextDouble();
```

```
String query = "INSERT INTO menu (item_id, name, category, price) VALUES  
    (?, ?, ?, ?);  
try (PreparedStatement ps = conn.prepareStatement(query)) {  
    ps.setInt(1, itemId);  
    ps.setString(2, name);  
    ps.setString(3, category);  
    ps.setDouble(4, price);  
    int rows = ps.executeUpdate();  
    if (rows > 0)  
        System.out.println("Menu item added successfully");  
    else  
        System.out.println("Failed to add item.");  
} catch (SQLException e) {  
    System.out.println("Error adding item: " + e.getMessage());  
}  
}  
  
public static void updateItemPrice(Connection conn, Scanner scanner) {  
    int itemId = scanner.nextInt();  
    double newPrice = scanner.nextDouble();  
  
    String query = "UPDATE menu SET price = ? WHERE item_id = ?";  
    try (PreparedStatement ps = conn.prepareStatement(query)) {  
        ps.setDouble(1, newPrice);  
        ps.setInt(2, itemId);  
        int rows = ps.executeUpdate();  
        if (rows > 0)  
            System.out.println("Item price updated successfully");  
        else  
            System.out.println("Item not found.");  
    } catch (SQLException e) {  
        System.out.println("Error updating price: " + e.getMessage());  
    }  
}  
  
public static void viewItemDetails(Connection conn, Scanner scanner) {  
    int itemId = scanner.nextInt();  
    String query = "SELECT * FROM menu WHERE item_id = ?";  
  
    try (PreparedStatement ps = conn.prepareStatement(query)) {  
        ps.setInt(1, itemId);  
        ResultSet rs = ps.executeQuery();
```

```
if (rs.next()) {
    System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",
        rs.getInt("item_id"), rs.getString("name"),
        rs.getString("category"), rs.getDouble("price"));
} else {
    System.out.println("Item not found.");
}
} catch (SQLException e) {
    System.out.println("Error retrieving item details: " + e.getMessage());
}
}

public static void displayAllMenuItems(Connection conn) {
String query = "SELECT * FROM menu ORDER BY item_id";

try (Statement st = conn.createStatement()) {
    ResultSet rs = st.executeQuery(query);
    System.out.println("ID | Name | Category | Price");
    while (rs.next()) {
        System.out.printf("%d | %s | %s | %.2f%n",
            rs.getInt("item_id"), rs.getString("name"),
            rs.getString("category"), rs.getDouble("price"));
    }
} catch (SQLException e) {
    System.out.println("Error displaying menu items: " + e.getMessage());
}
}

class MenuItem {
    private int itemId;
    private String name;
    private String category;
    private double price;

    public MenuItem(int itemId, String name, String category, double price) {
        this.itemId = itemId;
        this.name = name;
        this.category = category;
        this.price = price;
    }
}
```

```
public int getItemId() { return itemId; }
public void setItemId(int itemId) { this.itemId = itemId; }
public String getName() { return name; }
public void setName(String name) { this.name = name; }
public String getCategory() { return category; }
public void setCategory(String category) { this.category = category; }
public double getPrice() { return price; }
public void setPrice(double price) { this.price = price; }
}
}
//
```

Status : Correct

Marks : 10/10