

Rajalakshmi Engineering College

Name: IDC .

Email: 241501178@rajalakshmi.edu.in

Roll no: 241501178

Phone: 7904386392

Branch: REC

Department: AI & ML - Section 2

Batch: 2028

Degree: B.E - AI & ML

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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 itemId = scanner.nextInt();
    String name = scanner.next();
    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, itemId);
    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 itemId = scanner.nextInt();
    int quantityToAdd = scanner.nextInt();

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

```
if (rs.next()) {
    int currentQty = rs.getInt("quantity");
    String updateSql = "UPDATE items SET quantity = ? WHERE item_id = ?";
    PreparedStatement updatePs = conn.prepareStatement(updateSql);
    updatePs.setInt(1, currentQty + quantityToAdd);
    updatePs.setInt(2, itemId);
    updatePs.executeUpdate();
    System.out.println("Item restocked successfully");
} else {
    System.out.println("Item not found.");
}
} catch (SQLException e) {
    System.out.println("Item not found.");
}
}

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

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

    if (rs.next()) {
        int currentQty = rs.getInt("quantity");
        if (currentQty >= quantityToRemove) {
            String updateSql = "UPDATE items SET quantity = ? WHERE item_id
= ?";
            PreparedStatement updatePs = conn.prepareStatement(updateSql);
            updatePs.setInt(1, currentQty - quantityToRemove);
            updatePs.setInt(2, itemId);
            updatePs.executeUpdate();
            System.out.println("Stock reduced successfully");
        } else {
            System.out.println("Not enough stock to remove.");
        }
    } else {
        System.out.println("Item not found.");
    }
}
```

```

        }
    } 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);

    boolean hasRows = false;
    while (rs.next()) {
        if (!hasRows) {
            System.out.println("ID | Name | Quantity | Price"); // Print header once
            hasRows = true;
        }
        int id = rs.getInt("item_id");
        String name = rs.getString("name");
        int qty = rs.getInt("quantity");
        double price = rs.getDouble("price");
        System.out.printf("%d | %s | %d | %.2f\n", id, name, qty, price);
    }

    if (!hasRows) {
    }
} 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();
}
}

public static void addMenuItem(Connection conn, Scanner scanner) {
    try {
        int itemId = scanner.nextInt();
        scanner.nextLine();
        String name = scanner.nextLine();
        String category = scanner.nextLine();
        double price = scanner.nextDouble();
        scanner.nextLine();

        String sql = "INSERT INTO menu (item_id, name, category, price) VALUES (?, ?, ?, ?)";
        try (PreparedStatement stmt = conn.prepareStatement(sql)) {
            stmt.setInt(1, itemId);
            stmt.setString(2, name);
            stmt.setString(3, category);
            stmt.setDouble(4, price);
            stmt.executeUpdate();
        }
    } catch (SQLException e) {
        e.printStackTrace();
    }
}
```

```
        stmt.setString(2, name);
        stmt.setString(3, category);
        stmt.setDouble(4, price);

        int rows = stmt.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("Failed to add item.");
    e.printStackTrace();
}
}

public static void updateItemPrice(Connection conn, Scanner scanner) {
    try {
        int itemId = scanner.nextInt();
        double newPrice = scanner.nextDouble();
        scanner.nextLine();

        String sql = "UPDATE menu SET price = ? WHERE item_id = ?";
        try (PreparedStatement stmt = conn.prepareStatement(sql)) {
            stmt.setDouble(1, newPrice);
            stmt.setInt(2, itemId);

            int rows = stmt.executeUpdate();
            if (rows > 0) {
                System.out.println("Item price updated successfully");
            } else {
                System.out.println("Item not found.");
            }
        }
    } catch (SQLException e) {
        System.out.println("Item not found.");
        e.printStackTrace();
    }
}

public static void viewItemDetails(Connection conn, Scanner scanner) {
```

```
try {
    int itemId = scanner.nextInt();
    scanner.nextLine();

    String sql = "SELECT * FROM menu WHERE item_id = ?";
    try (PreparedStatement stmt = conn.prepareStatement(sql)) {
        stmt.setInt(1, itemId);
        ResultSet rs = stmt.executeQuery();

        if (rs.next()) {
            System.out.println("ID: " + rs.getInt("item_id") +
                " | Name: " + rs.getString("name") +
                " | Category: " + rs.getString("category") +
                " | Price: " + String.format("%.2f", rs.getDouble("price")));
        } else {
            System.out.println("Item not found.");
        }
    }
} catch (SQLException e) {
    System.out.println("Item not found.");
    e.printStackTrace();
}

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

            boolean hasItems = false;
            while (rs.next()) {
                if (!hasItems) {
                    System.out.println("ID | Name | Category | Price");
                    hasItems = true;
                }
                System.out.println(rs.getInt("item_id") + " | " +
                    rs.getString("name") + " | " +
                    rs.getString("category") + " | " +
                    String.format("%.2f", rs.getDouble("price")));
            }
        }
    }
}
```

```
        } catch (SQLException e) {  
            System.out.println("Error displaying menu items.");  
            e.printStackTrace();  
        }  
    }  
//
```

Status : Correct

Marks : 10/10