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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

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 addItem(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();
}
}

```

```

private static void addMenuItem(Connection conn, Scanner scanner) throws
SQLException {

```

```

    MenuItemDAO dao = new MenuItemDAO();

```

```

    int id = scanner.nextInt();

```

```

    scanner.nextLine();

```

```

    String name = scanner.nextLine();

```

```

    String category = scanner.nextLine();

```

```

    double price = scanner.nextDouble();

```

```

    MenuItem item = new MenuItem(id, name, category, price);

```

```

    dao.addMenuItem(conn, item);

```

```

}

```

```

private static void updateItemPrice(Connection conn, Scanner scanner)
throws SQLException {

```

```

    MenuItemDAO dao = new MenuItemDAO();

```

```

    int id = scanner.nextInt();

```

```

    double newPrice = scanner.nextDouble();

```

```

    dao.updateItemPrice(conn, id, newPrice);

```

```

}

```

```

private static void viewItemDetails(Connection conn, Scanner scanner) throws
SQLException {

```

```

        MenuItemDAO dao = new MenuItemDAO();
        int id = scanner.nextInt();
        dao.viewItemDetails(conn, id);
    }

    private static void displayAllMenuItems(Connection conn) throws
    SQLException {
        MenuItemDAO dao = new MenuItemDAO();
        dao.displayAllMenuItems(conn);
    }
}

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) {
        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; }
}

class MenuItemDAO {

```



```
public void addItem(Connection conn, MenuItem menuItem) throws
SQLException {
    String sql = "INSERT INTO menu (item_id, name, category, price) VALUES
(?, ?, ?, ?)";
```

```
    try (PreparedStatement ps = conn.prepareStatement(sql)) {
        ps.setInt(1, menuItem.getItemId());
        ps.setString(2, menuItem.getName());
        ps.setString(3, menuItem.getCategory());
        ps.setDouble(4, menuItem.getPrice());
```

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

```
    }
}
```

```
public void updateItemPrice(Connection conn, int itemId, double newPrice)
throws SQLException {
    String sql = "UPDATE menu SET price = ? WHERE item_id = ?";
```

```
    try (PreparedStatement ps = conn.prepareStatement(sql)) {
        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.");
```

```
    }
}
```

```
public MenuItem viewItemDetails(Connection conn, int itemId) throws
SQLException {
    String sql = "SELECT * FROM menu WHERE item_id = ?";
```

```
    try (PreparedStatement ps = conn.prepareStatement(sql)) {
        ps.setInt(1, itemId);
```

```

        ResultSet rs = ps.executeQuery();

        if (rs.next()) {
            MenuItem item = mapToMenuItem(rs);
            System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",
                item.getItemId(), item.getName(), item.getCategory(),
                item.getPrice());
            return item;
        } else {
            System.out.println("Item not found.");
            return null;
        }
    }
}

```

```

public java.util.List<MenuItem> displayAllMenuItems(Connection conn)
throws SQLException {
    String sql = "SELECT * FROM menu ORDER BY item_id";
    java.util.List<MenuItem> items = new java.util.ArrayList<>();

```

```

        try (Statement st = conn.createStatement()) {
            ResultSet rs = st.executeQuery(sql);

            System.out.println("ID | Name | Category | Price");
            while (rs.next()) {
                MenuItem item = mapToMenuItem(rs);
                items.add(item);
                System.out.printf("%d | %s | %s | %.2f%n",
                    item.getItemId(), item.getName(), item.getCategory(),
                    item.getPrice());
            }
        }
        return items;
    }
}

```

```

private MenuItem mapToMenuItem(ResultSet rs) throws SQLException {
    return new MenuItem(
        rs.getInt("item_id"),
        rs.getString("name"),
        rs.getString("category"),
        rs.getDouble("price")
    );
}

```

```
}  
}  
//
```

Status : Correct

Marks : 10/10

2. 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 sc) throws SQLException {
    int id = sc.nextInt();
    sc.nextLine();
    String name = sc.nextLine();
    int qty = sc.nextInt();
    double price = sc.nextDouble();

    String sql = "INSERT INTO items (item_id, name, quantity, price) VALUES
    (?, ?, ?, ?)";

```

```

        try (PreparedStatement ps = conn.prepareStatement(sql)) {
            ps.setInt(1, id);
            ps.setString(2, name);
            ps.setInt(3, qty);
            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.");
        }
    }

    // ----- RESTOCK ITEM -----
    public static void restockItem(Connection conn, Scanner sc) throws
    SQLException {
        int id = sc.nextInt();
        int addQty = sc.nextInt();

        String select = "SELECT quantity FROM items WHERE item_id = ?";
        String update = "UPDATE items SET quantity = quantity + ? WHERE item_id
        = ?";

        try (PreparedStatement ps = conn.prepareStatement(select)) {
            ps.setInt(1, id);
            ResultSet rs = ps.executeQuery();

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

        try (PreparedStatement ps = conn.prepareStatement(update)) {
            ps.setInt(1, addQty);
            ps.setInt(2, id);
            ps.executeUpdate();
            System.out.println("Item restocked successfully");
        }
    }
}

```

```

// ----- REDUCE STOCK -----
public static void reduceStock(Connection conn, Scanner sc) throws
SQLException {
    int id = sc.nextInt();
    int removeQty = sc.nextInt();

    String select = "SELECT quantity FROM items WHERE item_id = ?";
    String update = "UPDATE items SET quantity = quantity - ? WHERE item_id
= ?";

    int currentQty = 0;

    try (PreparedStatement ps = conn.prepareStatement(select)) {
        ps.setInt(1, id);
        ResultSet rs = ps.executeQuery();

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

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

    if (removeQty > currentQty) {
        System.out.println("Not enough stock to remove.");
        return;
    }

    try (PreparedStatement ps = conn.prepareStatement(update)) {
        ps.setInt(1, removeQty);
        ps.setInt(2, id);
        ps.executeUpdate();
        System.out.println("Stock reduced successfully");
    }
}

// ----- DISPLAY INVENTORY -----
public static void displayInventory(Connection conn) throws SQLException {
    String sql = "SELECT * FROM items ORDER BY item_id";

    try (Statement st = conn.createStatement()) {

```



```
ResultSet rs = st.executeQuery(sql);

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

while (rs.next()) {
    System.out.printf("%d | %s | %d | %.2f%n",
        rs.getInt("item_id"),
        rs.getString("name"),
        rs.getInt("quantity"),
        rs.getDouble("price"));
}
}
```

Status : Correct

Marks : 10/10