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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 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.");  
    }  
}  
}  
}  
}  
}  
}
```

// You are using Java

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

//Write your code here

```
    int itemId = scanner.nextInt();  
    scanner.nextLine(); // consume newline  
    String name = scanner.nextLine();  
    String category = scanner.nextLine();  
    double price = scanner.nextDouble();
```

```
    MenuItemDAO dao = new MenuItemDAO();
```

```
    MenuItem item = new MenuItem(itemId, name, category, price);
```

```
    try {
```

```
        dao.addMenuItem(conn, item);  
        System.out.println("Menu item added successfully");
```

```
    } catch (SQLException e) {
```

```
        System.out.println("Failed to add item.");
```

```
    }
```

```
}
```

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

//Write your code here

```
    int itemId = scanner.nextInt();
```

```
    double newPrice = scanner.nextDouble();
```

```
MenuItemDAO dao = new MenuItemDAO();

try {
    dao.updateItemPrice(conn, itemId, newPrice);
    System.out.println("Item price updated successfully");
} catch (SQLException e) {
    System.out.println("Item not found.");
}

public static void viewItemDetails(Connection conn, Scanner scanner) {
    //Write your code here
    int itemId = scanner.nextInt();

    MenuItemDAO dao = new MenuItemDAO();

    try {
        MenuItem item = dao.viewItemDetails(conn, itemId);
        if (item != null) {
            System.out.println("ID: " + item.getItemId() + " | Name: " +
item.getName() +
                " | Category: " + item.getCategory() + " | Price: " +
item.getPrice());
        } else {
            System.out.println("Item not found.");
        }
    } catch (SQLException e) {
        System.out.println("Item not found.");
    }
}

public static void displayAllMenuItems(Connection conn) {
    //Write your code here
    MenuItemDAO dao = new MenuItemDAO();
    try {
        dao.displayAllMenuItems(conn);
    } catch (SQLException e) {
        e.printStackTrace();
    }
}
```

```
}

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

    // Constructor
    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; }

    //Include getters and setters
}
class MenuItemDAO {
    public void addMenuItem(Connection conn, MenuItem menuItem) throws
SQLException {
        String sql = "INSERT INTO menu (item_id, name, category, price) VALUES
(?, ?, ?, ?)";
        try (PreparedStatement pstmt = conn.prepareStatement(sql)) {
            pstmt.setInt(1, menuItem.getItemId());
            pstmt.setString(2, menuItem.getName());
            pstmt.setString(3, menuItem.getCategory());
            pstmt.setDouble(4, menuItem.getPrice());
            pstmt.executeUpdate();
        }
    }
}
```

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

```
        String sql = "UPDATE menu SET price = ? WHERE item_id = ?";  
        try (PreparedStatement pstmt = conn.prepareStatement(sql)) {  
            pstmt.setDouble(1, newPrice);  
            pstmt.setInt(2, itemId);  
            int rowsAffected = pstmt.executeUpdate();  
            if (rowsAffected == 0) {  
                throw new SQLException("Item not found");  
            }  
        }
```

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

```
        String sql = "SELECT * FROM menu WHERE item_id = ?";  
        try (PreparedStatement pstmt = conn.prepareStatement(sql)) {  
            pstmt.setInt(1, itemId);  
            try (ResultSet rs = pstmt.executeQuery()) {  
                if (rs.next()) {  
                    return mapToMenuItem(rs);  
                }  
            }  
        }  
        return null;  
    }
```

```
public void displayAllMenuItems(Connection conn) throws SQLException {
```

```
    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;  
            }  
            MenuItem item = mapToMenuItem(rs);  
            System.out.printf("%d | %s | %s | %.2f%n",
```

```
        item.getItemId(), item.getName(), item.getCategory(),
item.getPrice());
    }
}
}

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();
}

// You are using Java
public static void addItem(Connection conn, Scanner scanner) {
    // write your code here
    try {
        int itemId = scanner.nextInt();
        scanner.nextLine(); // consume newline
        String name = scanner.nextLine();
        int quantity = scanner.nextInt();
        double price = scanner.nextDouble();

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

        int rowsAffected = pstmt.executeUpdate();
        if (rowsAffected > 0) {
            System.out.println("Item added successfully");
        } else {
            System.out.println("Failed to add item.");
        }

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

public static void restockItem(Connection conn, Scanner scanner) {
    // write your code here
    try {
        int itemId = scanner.nextInt();
        int quantityToAdd = scanner.nextInt();

        // First check if item exists
        String checkSql = "SELECT * FROM items WHERE item_id = ?";
```

```
PreparedStatement checkStmt = conn.prepareStatement(checkSql);
checkStmt.setInt(1, itemId);
ResultSet rs = checkStmt.executeQuery();

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

// Update the quantity
String updateSql = "UPDATE items SET quantity = quantity + ? WHERE
item_id = ?";
PreparedStatement updateStmt = conn.prepareStatement(updateSql);
updateStmt.setInt(1, quantityToAdd);
updateStmt.setInt(2, itemId);

int rowsAffected = updateStmt.executeUpdate();
if (rowsAffected > 0) {
    System.out.println("Item restocked successfully");
}

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

}

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

        // First check if item exists and has sufficient quantity
        String checkSql = "SELECT quantity FROM items WHERE item_id = ?";
        PreparedStatement checkStmt = conn.prepareStatement(checkSql);
        checkStmt.setInt(1, itemId);
        ResultSet rs = checkStmt.executeQuery();

        if (!rs.next()) {
```

```
        System.out.println("Item not found.");
        checkStmt.close();
        return;
    }

    int currentQuantity = rs.getInt("quantity");
    checkStmt.close();

    if (currentQuantity < quantityToRemove) {
        System.out.println("Not enough stock to remove.");
        return;
    }

    // Update the quantity
    String updateSql = "UPDATE items SET quantity = quantity - ? WHERE
item_id = ?";
    PreparedStatement updateStmt = conn.prepareStatement(updateSql);
    updateStmt.setInt(1, quantityToRemove);
    updateStmt.setInt(2, itemId);

    int rowsAffected = updateStmt.executeUpdate();
    if (rowsAffected > 0) {
        System.out.println("Stock reduced successfully");
    }

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

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

        boolean hasData = false;
        System.out.println("ID | Name | Quantity | Price");
        while (rs.next()) {
            hasData = true;

```

```
        int itemId = rs.getInt("item_id");
        String name = rs.getString("name");
        int quantity = rs.getInt("quantity");
        double price = rs.getDouble("price");

        System.out.printf("%d | %s | %d | %.2f%n",itemId,name,quantity,price);
    }

    // If no items found, print nothing as per requirements
    if (!hasData) {
        // Print nothing as specified in requirements
    }

    rs.close();
    stmt.close();
} catch (SQLException e) {
    e.printStackTrace();
}

}

}
```

Status : Correct

Marks : 10/10