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

// You are using Java

```
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 pstmt = conn.prepareStatement(sql)){
```

```
        pstmt.setInt(1, itemId);  
        pstmt.setString(2, name);  
        pstmt.setString(3, category);  
        pstmt.setDouble(4, price);
```

```
        int rows = pstmt.executeUpdate();  
        if (rows > 0){
```

```
            System.out.println("Menu item added successfully");
```

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

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 pstmt = conn.prepareStatement(sql)){
            pstmt.setDouble(1, newPrice);
            pstmt.setInt(2, itemId);

            int rows = pstmt.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.");
    }
}

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

        String sql = "SELECT item_id, name, category, price FROM menu WHERE
item_id = ?";
```

```
try (PreparedStatement pstmt = conn.prepareStatement(sql)){
    pstmt.setInt(1, itemId);
    try (ResultSet rs = pstmt.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("Item not found.");
}
}

public static void displayAllMenuItems(Connection conn){
    String sql = "SELECT item_id, name, category, price FROM menu ORDER BY item_id ASC";

    try (PreparedStatement pstmt = conn.prepareStatement(sql);
        ResultSet rs = pstmt.executeQuery()){
        if (rs.next()){
            System.out.println("ID | Name | Category | Price");

            System.out.printf(
                "%d | %s | %s | %.2f%n",
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("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")
    );
}
} else {
    // No items - print nothing (per problem statement this is acceptable)
}
} catch (SQLException e){
    // suppress detailed DB errors for matching expected outputs
}
}
```

```
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;
    }
}
}

//
```

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){
    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
        (?, ?, ?, ?)";
        try (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 == 1){
                System.out.println("Item added successfully");
            } else {
                System.out.println("Failed to add item.");
            }
        }
    } catch (SQLException e){
        System.out.println("Failed to add item.");
    } catch (Exception e){
        System.out.println("Failed to add item.");
    }
}

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

        String selectSql = "SELECT quantity FROM items WHERE item_id = ?";
        try (PreparedStatement psSelect = conn.prepareStatement(selectSql)){
            psSelect.setInt(1, itemId);
            try (ResultSet rs = psSelect.executeQuery()){
                if (!rs.next()){
                    System.out.println("Item not found.");
                }
            }
        }
    }
}
```

```
        return;
    }
}

String updateSql = "UPDATE items SET quantity = quantity + ? WHERE item_id = ?";
try (PreparedStatement psUpdate = conn.prepareStatement(updateSql)){
    psUpdate.setInt(1, qtyToAdd);
    psUpdate.setInt(2, itemId);
    int rows = psUpdate.executeUpdate();
    if (rows == 1){
        System.out.println("Item restocked successfully");
    } else {
        System.out.println("Item not found.");
    }
}
} catch (SQLException e) {
    System.out.println("Item not found.");
} catch (Exception e) {
    System.out.println("Item not found.");
}
}

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

        String selectSql = "SELECT quantity FROM items WHERE item_id = ?";
        try (PreparedStatement psSelect = conn.prepareStatement(selectSql)) {

            psSelect.setInt(1, itemId);
            try (ResultSet rs = psSelect.executeQuery()){
                if (!rs.next()){
                    System.out.println("Item not found.");
                    return;
                }
                int currentQty = rs.getInt("quantity");
                if (currentQty < qtyToRemove){


```

```
        System.out.println("Not enough stock to remove.");
        return;
    }
}

String updateSql = "UPDATE items SET quantity = quantity - ? WHERE
item_id = ?";
try (PreparedStatement psUpdate = conn.prepareStatement(updateSql)){
    psUpdate.setInt(1, qtyToRemove);
    psUpdate.setInt(2, itemId);
    int rows = psUpdate.executeUpdate();
    if (rows == 1){

        System.out.println("Stock reduced successfully");
    } else {

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

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

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

    boolean any = false;
    while (rs.next()) {
        any = true;
        int id = rs.getInt("item_id");
        String name = rs.getString("name");
        System.out.print(id + " | ");
        System.out.print(name + " | ");
        System.out.print(rs.getInt("quantity") + " | ");
        System.out.print(rs.getDouble("price") + " | ");
        System.out.println();
    }
    if (!any)
        System.out.println("No items found in inventory.");
}
}
```

```
        int qty = rs.getInt("quantity");
        double price = rs.getDouble("price");
        System.out.println(id + " | " + name + " | " + qty + " | " + String.format("%.2f",
    price));
    }
} catch (SQLException e) {}

}
```

Status : Correct

Marks : 10/10