

Rajalakshmi Engineering College

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Batch: 2028

Degree: B.E - IT

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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();
}
}

public static void addMenuItem(Connection conn, Scanner scanner) {
    int itemId = scanner.nextInt();
    scanner.nextLine(); // Consume newline

    String name = scanner.nextLine();
    String category = scanner.nextLine();
    double price = scanner.nextDouble();

    MenuItem menuItem = new MenuItem(itemId, name, category, price); // Using POJO

    String insertQuery = "INSERT INTO menu (item_id, name, category, price)
VALUES (?, ?, ?, ?)";
    try (PreparedStatement stmt = conn.prepareStatement(insertQuery)) {
        stmt.setInt(1, menuItem.getItemId());
        stmt.setString(2, menuItem.getName());
        stmt.setString(3, menuItem.getCategory());
        stmt.setDouble(4, menuItem.getPrice());

        int rowsInserted = stmt.executeUpdate();
        System.out.println(rowsInserted > 0 ? "Menu item added successfully" :
"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 updateQuery = "UPDATE menu SET price = ? WHERE item_id = ?";  
        try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {  
            stmt.setDouble(1, newPrice);  
            stmt.setInt(2, itemId);  
  
            int rowsUpdated = stmt.executeUpdate();  
            System.out.println(rowsUpdated > 0 ? "Item price updated successfully" :  
                "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 selectQuery = "SELECT * FROM menu WHERE item_id = ?";  
        try (PreparedStatement stmt = conn.prepareStatement(selectQuery)) {  
            stmt.setInt(1, itemId);  
  
            ResultSet rs = stmt.executeQuery();  
            if (rs.next()) {  
                MenuItem menuItem = new MenuItem(  
                    rs.getInt("item_id"),  
                    rs.getString("name"),  
                    rs.getString("category"),  
                    rs.getDouble("price")  
                );  
  
                System.out.printf("ID: %d | Name: %s | Category: %s | Price: %.2f%n",  
                    menuItem.getItemId(),  
                    menuItem.getName(),  
                    menuItem.getCategory(),  
                    menuItem.getPrice());  
            } else {  
                System.out.println("Item not found.");  
            }  
        } catch (SQLException e) {  
            System.out.println("Error retrieving item details: " + e.getMessage());  
        }  
    }  
}
```

```
        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 displayQuery = "SELECT * FROM menu ORDER BY item_id";
    try (Statement stmt = conn.createStatement();
         ResultSet rs = stmt.executeQuery(displayQuery)) {

        System.out.println("ID | Name | Category      | Price");
        while (rs.next()) {
            MenuItem menuItem = new MenuItem(
                rs.getInt("item_id"),
                rs.getString("name"),
                rs.getString("category"),
                rs.getDouble("price")
            );
            System.out.printf("%d | %s | %s | %.2f%n",
                menuItem.getItemId(),
                menuItem.getName(),
                menuItem.getCategory(),
                menuItem.getPrice());
        }
    } 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;

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

```
        this.name = name;
        this.category = category;
        this.price = price;
    }

    // Getters and Setters
    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();
}
}

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

    String name = scanner.nextLine();

    int quantity = scanner.nextInt();

    double price = scanner.nextDouble();

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

        int rowsInserted = stmt.executeUpdate();
        System.out.println(rowsInserted > 0 ? "Item added successfully" : "Failed
to add item.");
    } catch (SQLException e) {
        System.out.println("Error adding item: " + e.getMessage());
    }
}

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

    int quantityToAdd = scanner.nextInt();

    // Check if the quantity is positive
    if (quantityToAdd <= 0) {
        System.out.println("Quantity to add must be positive.");
        return;
    }
}
```

```
String updateQuery = "UPDATE items SET quantity = quantity + ? WHERE item_id = ?";  
try (PreparedStatement stmt = conn.prepareStatement(updateQuery)) {  
    stmt.setInt(1, quantityToAdd);  
    stmt.setInt(2, itemId);  
  
    int rowsUpdated = stmt.executeUpdate();  
    System.out.println(rowsUpdated > 0 ? "Item restocked successfully" :  
"Item not found.");  
} catch (SQLException e) {  
    System.out.println("Error during restock: " + e.getMessage());  
}  
}  
  
public static void reduceStock(Connection conn, Scanner scanner) {  
    int itemId = scanner.nextInt();  
  
    int quantityToRemove = scanner.nextInt();  
  
    // Check if the quantity is positive  
    if (quantityToRemove <= 0) {  
        System.out.println("Quantity to remove must be positive.");  
        return;  
    }  
  
    String checkQuantityQuery = "SELECT quantity FROM items WHERE item_id = ?";  
    String updateQuery = "UPDATE items SET quantity = quantity - ? WHERE item_id = ?";  
  
    try (PreparedStatement checkStmt =  
conn.prepareStatement(checkQuantityQuery)) {  
        checkStmt.setInt(1, itemId);  
        ResultSet rs = checkStmt.executeQuery();  
  
        if (rs.next()) {  
            int currentQuantity = rs.getInt("quantity");  
  
            if (currentQuantity >= quantityToRemove) {  
                try (PreparedStatement stmt =  
conn.prepareStatement(updateQuery)) {
```

```

        stmt.setInt(1, quantityToRemove);
        stmt.setInt(2, itemId);

        int rowsUpdated = stmt.executeUpdate();
        System.out.println(rowsUpdated > 0 ? "Stock reduced
successfully" : "Failed to reduce stock.");
    }
} else {
    System.out.println("Not enough stock to remove.");
}
} else {
    System.out.println("Item not found.");
}
} catch (SQLException e) {
    System.out.println("Error during stock reduction: " + e.getMessage());
}
}

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

        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"));
        }
    } catch (SQLException e) {
        System.out.println("Error displaying inventory: " + e.getMessage());
    }
}

}

```

Status : Correct

Marks : 10/10