

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

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 id = scanner.nextInt();
    scanner.nextLine();
    String name = scanner.nextLine();
    int qty = 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, 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.");
    }
} catch (SQLException e) {
    System.out.println("Failed to add item.");
}
}

public static void restockItem(Connection conn, Scanner scanner) {
try {
    int id = scanner.nextInt();
    int addQty = scanner.nextInt();
    String checkSql = "SELECT quantity FROM items WHERE item_id = ?";
    try (PreparedStatement checkStmt = conn.prepareStatement(checkSql)) {
        checkStmt.setInt(1, id);
        ResultSet rs = checkStmt.executeQuery();
        if (rs.next()) {
```

```
String updateSql = "UPDATE items SET quantity = quantity + ? WHERE item_id = ?";
try (PreparedStatement updateStmt = conn.prepareStatement(updateSql)) {
    updateStmt.setInt(1, addQty);
    updateStmt.setInt(2, id);
    updateStmt.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 id = scanner.nextInt();
    int reduceQty = scanner.nextInt();
    String selectSql = "SELECT quantity FROM items WHERE item_id = ?";
    try (PreparedStatement selectStmt = conn.prepareStatement(selectSql)) {
        selectStmt.setInt(1, id);

        ResultSet rs = selectStmt.executeQuery();
        if (rs.next()) {
            int currentQty = rs.getInt("quantity");
            if (currentQty >= reduceQty) {
                String updateSql = "UPDATE items SET quantity = quantity - ? WHERE item_id = ?";
                try (PreparedStatement updateStmt = conn.prepareStatement(updateSql)) {
                    updateStmt.setInt(1, reduceQty);
                    updateStmt.setInt(2, id);
                    updateStmt.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) {
    String sql = "SELECT * FROM items ORDER BY item_id";
    try (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 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 (!hasData) {}
    }
    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();
}
}

// You are using Java
public static void addMenuItem(Connection conn, Scanner scanner) {
//Write your code here
    int itemId= scanner.nextInt();
    scanner.nextLine();

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

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

    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": "Fail
to add item.");
}
catch(SQLException e){
    System.out.println("Error adding item:"+e.getMessage());
}

public static void updateItemPrice(Connection conn, Scanner scanner) {
    //Write your code here
    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) {
    //Write your code here
    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 retriving item details:"+ e.getMessage());
    }
}
```

```
public static void displayAllMenuItems(Connection conn) {
    //Write your code here
```

```
    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 retrieving details:"+ e.getMessage());
    }
}

public static 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;
    }

    //Include 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