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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) {
    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**

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();
        }
    }

    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());
        }
    }

    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**