

1. Implement Java-MySQL database connectivity program to display contents of student table.

```
Enter password: ****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 13
Server version: 8.0.35 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> ^C
mysql> CREATE DATABASE login_db;
Query OK, 1 row affected (0.01 sec)

mysql> USE login_db;
Database changed
mysql> CREATE TABLE users (
->     id INT AUTO_INCREMENT PRIMARY KEY,
->     username VARCHAR(50) UNIQUE NOT NULL,
->     password VARCHAR(50) NOT NULL
-> );
Query OK, 0 rows affected (0.08 sec)
```

```
import java.sql.*;

public class StudentDatabaseDisplay {
    public static void main(String[] args) {
        // Database credentials and URL
        String url = "jdbc:mysql://localhost:3306/school"; // Replace 'school' with your DB name
        String user = "root"; // Replace with your DB username
        String password = "root"; // Replace with your DB password

        // JDBC objects
        Connection conn = null;
        Statement stmt = null;
        ResultSet rs = null;

        try {
            // Load JDBC driver
            Class.forName("com.mysql.cj.jdbc.Driver");

            // Connect to database
            conn = DriverManager.getConnection(url, user, password);

            // Create a statement
            stmt = conn.createStatement();

            // Execute query
            String sql = "SELECT * FROM student";
            rs = stmt.executeQuery(sql);

            // Print results
            System.out.println("ID\tName\tGrade");
            System.out.println("-----");
            while (rs.next()) {
                int id = rs.getInt("id");
                String name = rs.getString("name");
                String grade = rs.getString("grade");
                System.out.println(id + "\t" + name + "\t" + grade);
            }
        } catch (Exception e) {
            e.printStackTrace();
        } finally {
            // Clean up resources
            try { if (rs != null) rs.close(); } catch (Exception e) {}
            try { if (stmt != null) stmt.close(); } catch (Exception e) {}
            try { if (conn != null) conn.close(); } catch (Exception e) {}
        }
    }
}
```

2. Implement Java-MySQL database connectivity program to perform following operations on the student table.

```
Enter password: *****
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.42 MySQL Community Server - GPL

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE student_db;
Query OK, 1 row affected (0.00 sec)

mysql>
mysql> USE student_db;
Database changed
mysql>
mysql> CREATE TABLE student (
->     id INT PRIMARY KEY,
->     name VARCHAR(50),
->     age INT,
->     course VARCHAR(50)
-> );
Query OK, 0 rows affected (0.01 sec)

mysql> |
```

```
import java.sql.*;
import java.util.Scanner;

public class StudentCRUD {
    static final String DB_URL = "jdbc:mysql://localhost:3306/student_db";
    static final String USER = "root"; // Change if needed
    static final String PASS = "your_password"; // Change if needed

    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);

        try (Connection conn = DriverManager.getConnection(DB_URL, USER, PASS)) {
            Class.forName("com.mysql.cj.jdbc.Driver");
            System.out.println("Connected to database!");

            while (true) {
                System.out.println("\n===== Student Menu =====");
                System.out.println("1. Insert Student");
                System.out.println("2. View All Students");
                System.out.println("3. Update Student");
                System.out.println("4. Delete Student");
                System.out.println("5. Exit");
                System.out.print("Choose an option: ");
                int choice = sc.nextInt();

                switch (choice) {
                    case 1:
                        insertStudent(conn, sc);
                        break;
                    case 2:
                        viewStudents(conn);
                        break;
                    case 3:
                        updateStudent(conn, sc);
                        break;
                    case 4:
                        deleteStudent(conn, sc);
                        break;
                    case 5:
                        System.out.println("Exiting...");
                        return;
                    default:
                        System.out.println("Invalid choice!");
                }
            }

        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    static void insertStudent(Connection conn, Scanner sc) throws SQLException {
        System.out.print("Enter ID: ");
        int id = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter Name: ");
        String name = sc.nextLine();
        System.out.print("Enter Age: ");
        int age = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter Course: ");
        String course = sc.nextLine();

        String query = "INSERT INTO student VALUES (?, ?, ?, ?)";
        PreparedStatement pstmt = conn.prepareStatement(query);
        pstmt.setInt(1, id);

        pstmt.setString(2, name);
        pstmt.setInt(3, age);
        pstmt.setString(4, course);

        int rows = pstmt.executeUpdate();
        System.out.println(rows + " student inserted.");
    }

    static void viewStudents(Connection conn) throws SQLException {
        String query = "SELECT * FROM student";
        Statement stmt = conn.createStatement();
        ResultSet rs = stmt.executeQuery(query);

        System.out.println("\nID\tName\tAge\tCourse");
        System.out.println("-----");
        while (rs.next()) {
            System.out.println(rs.getInt("id") + "\t" +
                rs.getString("name") + "\t" +
                rs.getInt("age") + "\t" +
                rs.getString("course"));
        }
    }

    static void updateStudent(Connection conn, Scanner sc) throws SQLException {
        System.out.print("Enter ID of student to update: ");
        int id = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter new name: ");
        String name = sc.nextLine();
        System.out.print("Enter new age: ");
        int age = sc.nextInt();
        sc.nextLine();
        System.out.print("Enter new course: ");
        String course = sc.nextLine();

        String query = "UPDATE student SET name=?, age=?, course=? WHERE id=?";
        PreparedStatement pstmt = conn.prepareStatement(query);
        pstmt.setString(1, name);
        pstmt.setInt(2, age);
        pstmt.setString(3, course);
        pstmt.setInt(4, id);

        int rows = pstmt.executeUpdate();
        System.out.println(rows + " student updated.");
    }

    static void deleteStudent(Connection conn, Scanner sc) throws SQLException {
        System.out.print("Enter ID of student to delete: ");
        int id = sc.nextInt();

        String query = "DELETE FROM student WHERE id=?";
        PreparedStatement pstmt = conn.prepareStatement(query);
        pstmt.setInt(1, id);

        int rows = pstmt.executeUpdate();
        System.out.println(rows + " student deleted.");
    }
}
```

- Write a GUI based program to create a login form with the field's username and password. Store registration data in MySQL database.

```
import java.awt.*;
import java.awt.event.*;
import java.sql.*;
import javax.swing.*;

public class LoginForm extends JFrame implements ActionListener {
    // GUI components
    JTextField txtUser;
    JPasswordField txtPass;
    JButton btnLogin, btnRegister;

    // DB credentials
    final String DB_URL = "jdbc:mysql://localhost:3306/login_db";
    final String DB_USER = "root";
    final String DB_PASS = "qwerty@12345"; // Replace with your MySQL password

    public LoginForm() {
        setTitle("Login Form");
        setSize(300, 200);
        setLayout(new GridLayout(4, 2));
        setDefaultCloseOperation(EXIT_ON_CLOSE);

        // Labels and Fields
        add(new JLabel("Username:"));
        txtUser = new JTextField();
        add(txtUser);

        add(new JLabel("Password:"));
        txtPass = new JPasswordField();
        add(txtPass);

        // Buttons
        btnLogin = new JButton("Login");
        btnRegister = new JButton("Register");

        add(btnLogin);
        add(btnRegister);

        btnLogin.addActionListener(this);
        btnRegister.addActionListener(this);

        setVisible(true);
    }

    public void actionPerformed(ActionEvent e) {
        String username = txtUser.getText();
        String password = new String(txtPass.getPassword());

        if (username.isEmpty() || password.isEmpty()) {
            JOptionPane.showMessageDialog(this, "Please fill all fields.");
            return;
        }

        try {
            // Connect to DB
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection conn = DriverManager.getConnection(DB_URL, DB_USER, DB_PASS);

            if (e.getSource() == btnRegister) {
                // Register user
                String sql = "INSERT INTO users (username, password) VALUES (?, ?)";
                PreparedStatement ps = conn.prepareStatement(sql);
                ps.setString(1, username);
                ps.setString(2, password);
                ps.executeUpdate();
                JOptionPane.showMessageDialog(this, "Registration successful!");
                ps.close();
            } else if (e.getSource() == btnLogin) {
                // Login
                String sql = "SELECT * FROM users WHERE username = ? AND password = ?";
                PreparedStatement ps = conn.prepareStatement(sql);
                ps.setString(1, username);
                ps.setString(2, password);
                ResultSet rs = ps.executeQuery();
                if (rs.next()) {
                    JOptionPane.showMessageDialog(this, "Login successful!");
                } else {
                    JOptionPane.showMessageDialog(this, "Invalid credentials!");
                }
                rs.close();
                ps.close();
            }
            conn.close();
        } catch (SQLException ex) {
            JOptionPane.showMessageDialog(this, "Username already exists!");
        } catch (Exception ex) {
            ex.printStackTrace();
            JOptionPane.showMessageDialog(this, "Error: " + ex.getMessage());
        }
    }

    public static void main(String[] args) {
        new LoginForm();
    }
}
```

