GAM/IT/2022/F/0024 - S.A.D.C SAMARASINGHA

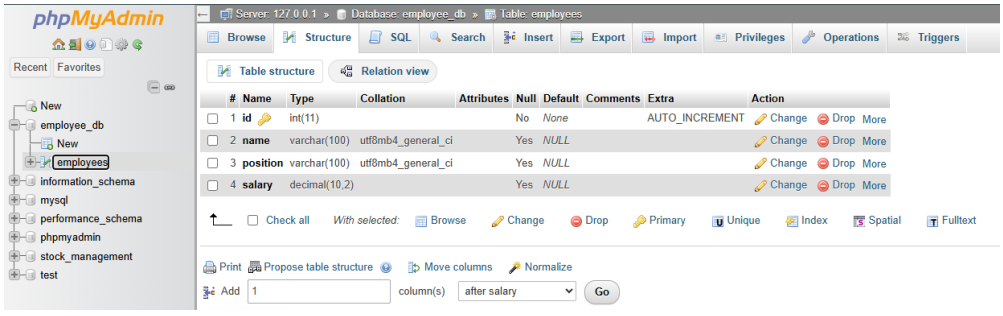
Lab Sheet : Java Database Connectivity (JDBC)

1. Set Up MySQL Database

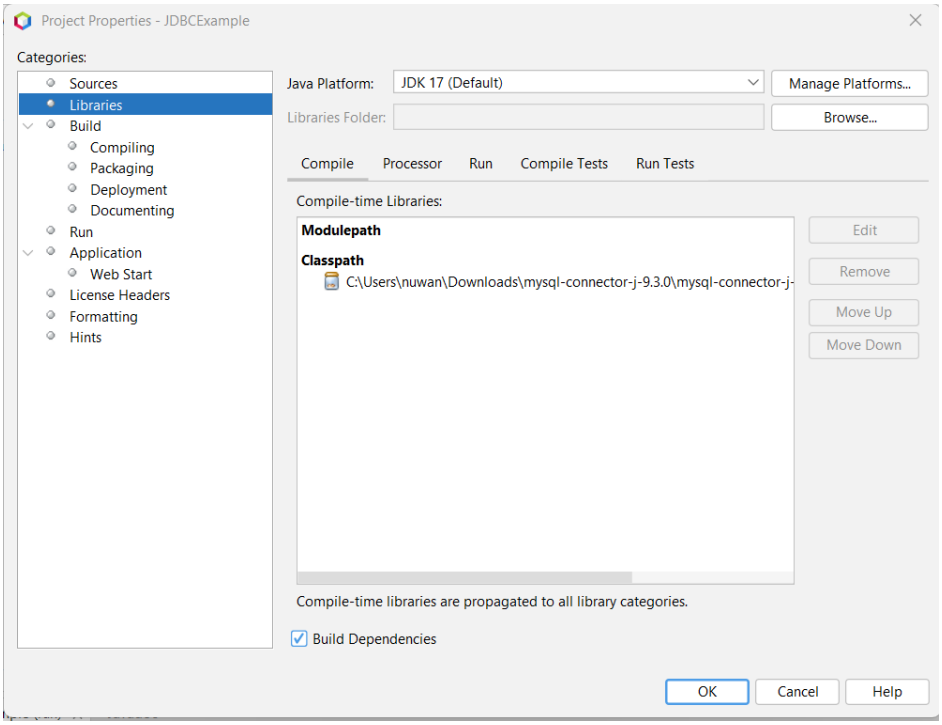
```
CREATE DATABASE employee_db;

USE employee_db;

 CREATE TABLE employees (

      id INT PRIMARY KEY AUTO_INCREMENT,

     name VARCHAR(100),

    position VARCHAR(100),

    salary DECIMAL(10, 2) );
```

-- Insert some sample data

```
  INSERT INTO employees (name, position, salary) VALUES ('John Doe', 'Software Engineer', 75000);

  INSERT INTO employees (name, position, salary) VALUES ('Jane Smith', 'HR Manager', 65000);

  INSERT INTO employees (name, position, salary) VALUES ('Steve Brown', 'Team Lead', 85000);
```

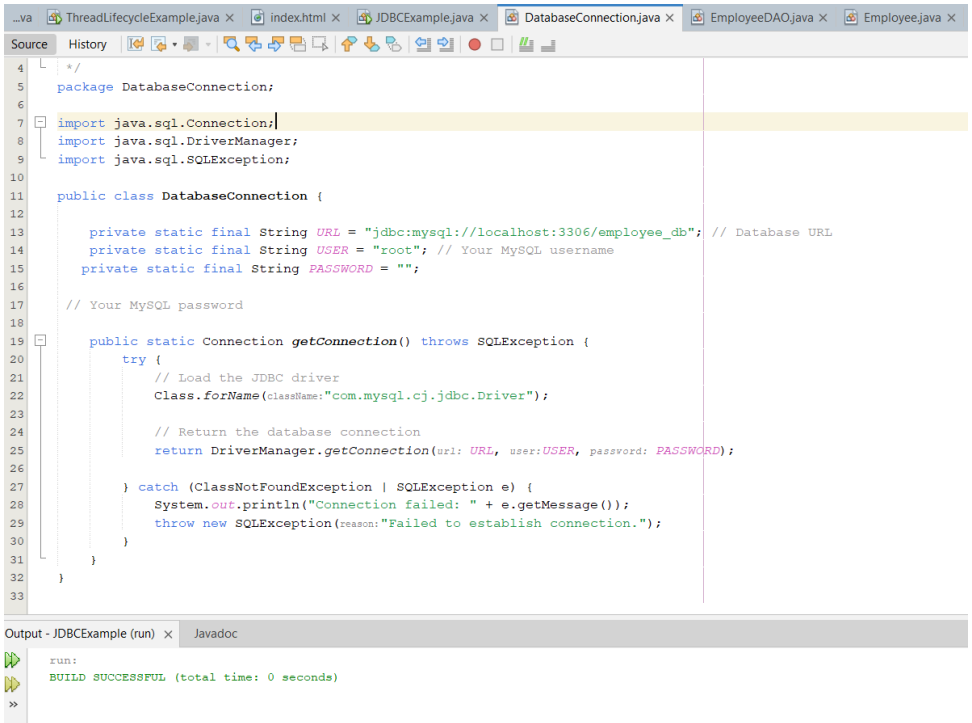


2. Set Up NetBeans Project



3. Establish JDBC Connection

```
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.SQLException;

 public class DatabaseConnection {
     private static final String URL =
"jdbc:mysql://localhost:3306/employee_db"; // Database URL
private static final String USER = "root"; // Your MySQL username
private static final String PASSWORD = "password"; // Your MySQL password
public static Connection getConnection() throws SQLException {
 try {
 // Load the JDBC driver
Class.forName("com.mysql.cj.jdbc.Driver");
// Return the database connection
return DriverManager.getConnection(URL, USER, PASSWORD);
 } catch (ClassNotFoundException | SQLException e) {
System.out.println("Connection failed: " + e.getMessage());
 throw new SQLException("Failed to establish connection."); } } }
```

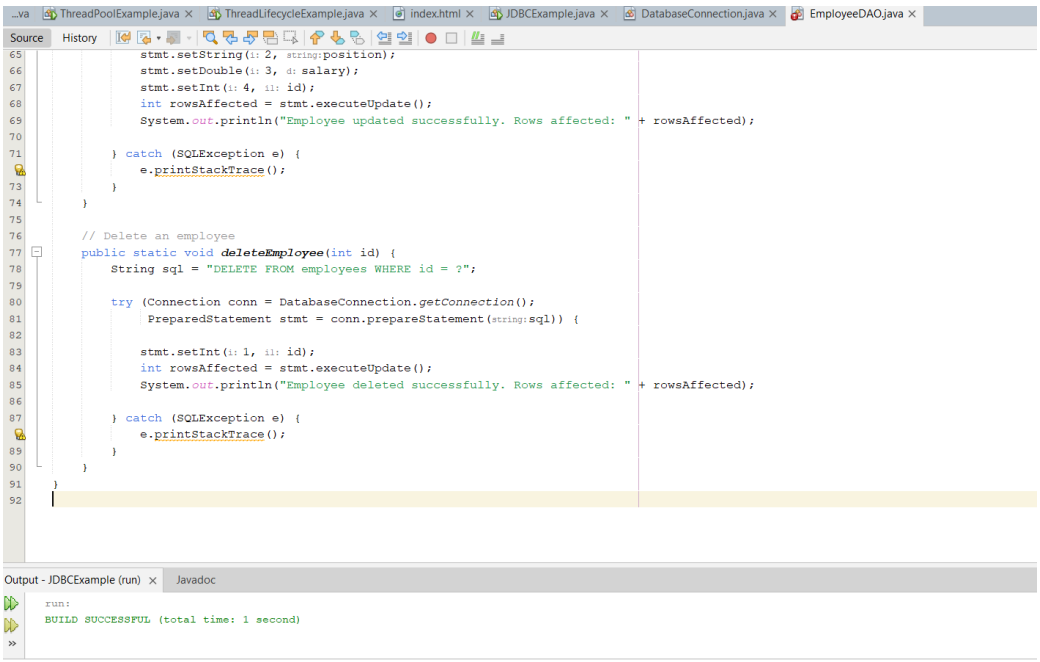


4. Perform CRUD Operations

```
import DatabaseConnection.DatabaseConnection;
import java.sql.*;
import java.util.ArrayList;
import java.util.List;

public class EmployeeDAO {

    // Create an employee
    public static void addEmployee(String name, String position, double salary) {
        String sql = "INSERT INTO employees (name, position, salary) VALUES (?, ?, ?)";
        try (Connection conn = DatabaseConnection.getConnection();
             PreparedStatement stmt = conn.prepareStatement(sql)) {

            stmt.setString(1, name);
            stmt.setString(2, position);
            stmt.setDouble(3, salary);
            int rowsAffected = stmt.executeUpdate();
            System.out.println("Employee added successfully. Rows affected: " +
rowsAffected);

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

```
    // Read all employees
    public static List<Employee> getAllEmployees() {
        List<Employee> employees = new ArrayList<>();
        String sql = "SELECT * FROM employees";

        try (Connection conn = DatabaseConnection.getConnection();
             Statement stmt = conn.createStatement();
             ResultSet rs = stmt.executeQuery(sql)) {

            while (rs.next()) {
                Employee employee = new Employee(
                        rs.getInt("id"),
                        rs.getString("name"),
                        rs.getString("position"),
                        rs.getDouble("salary")
                );
                employees.add(employee);
            }

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

        return employees;
    }

    // Update an employee's information
    public static void updateEmployee(int id, String name, String position, double salary) {
        String sql = "UPDATE employees SET name = ?, position = ?, salary = ? WHERE
id = ?";

        try (Connection conn = DatabaseConnection.getConnection();
             PreparedStatement stmt = conn.prepareStatement(sql)) {

            stmt.setString(1, name);
            stmt.setString(2, position);
            stmt.setDouble(3, salary);
            stmt.setInt(4, id);
            int rowsAffected = stmt.executeUpdate();
            System.out.println("Employee updated successfully. Rows affected: " +
rowsAffected);

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

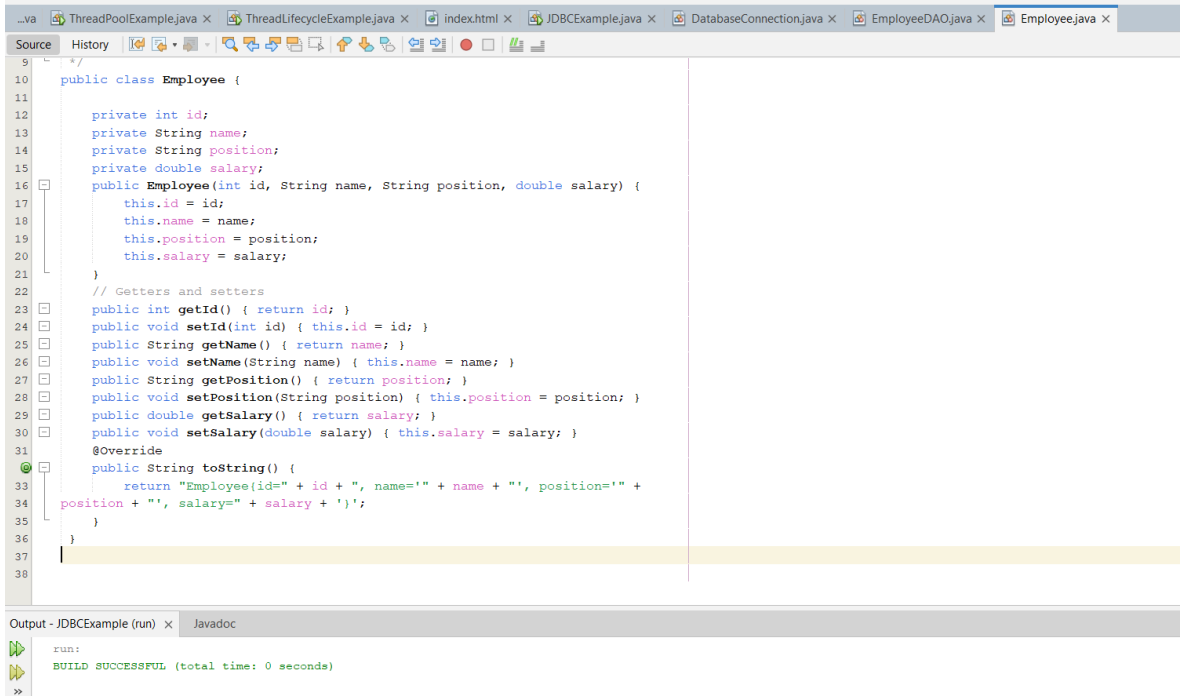
```
    }

    // Delete an employee
    public static void deleteEmployee(int id) {
        String sql = "DELETE FROM employees WHERE id = ?";

        try (Connection conn = DatabaseConnection.getConnection();
             PreparedStatement stmt = conn.prepareStatement(sql)) {

            stmt.setInt(1, id);
            int rowsAffected = stmt.executeUpdate();
            System.out.println("Employee deleted successfully. Rows affected: " +
rowsAffected);

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



5. Create Employee.java Class

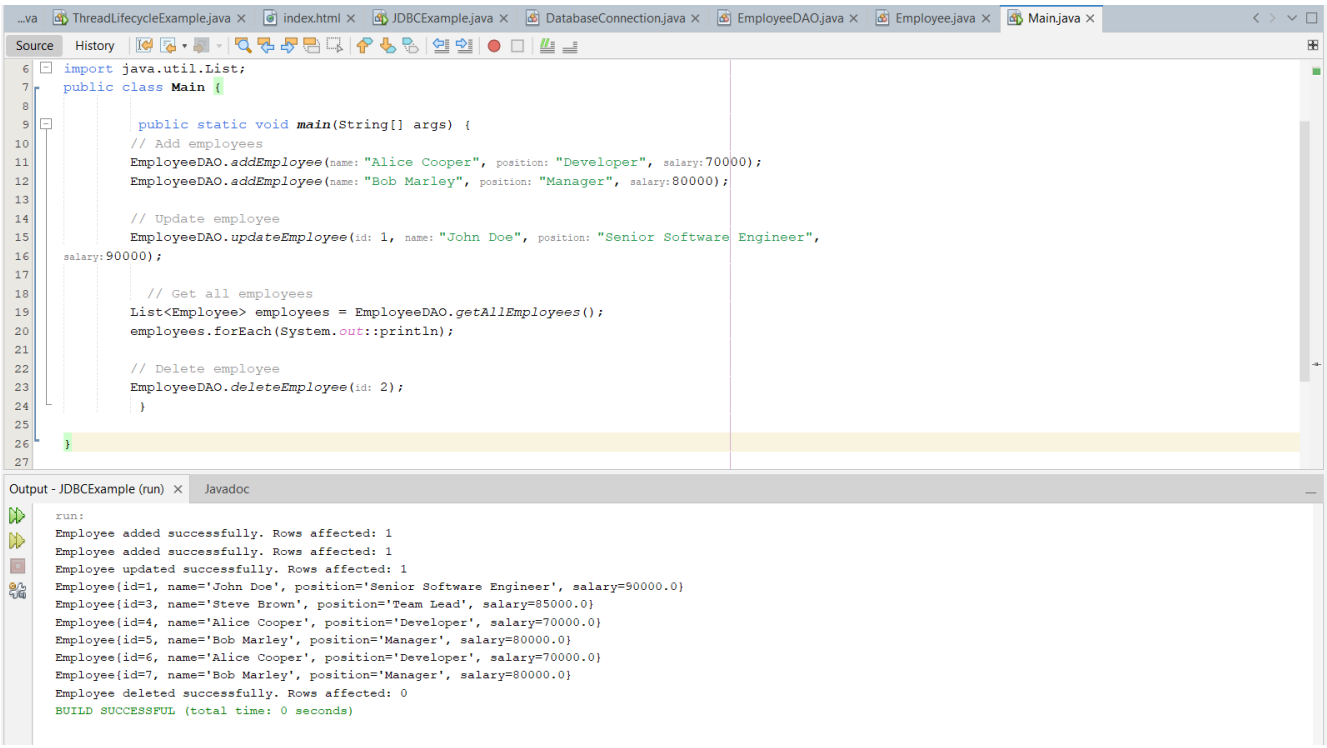
```
public class Employee {
    private int id;
    private String name;
    private String position;
    private double salary;
```

```
    public Employee(int id, String name, String position, double salary) {
        this.id = id;
        this.name = name;
        this.position = position;
        this.salary = salary;
    }

    // Getters and setters
    public int getId() { return id; }
    public void setId(int id) { this.id = id; }
    public String getName() { return name; }
    public void setName(String name) { this.name = name; }
    public String getPosition() { return position; }
    public void setPosition(String position) { this.position = position; }
    public double getSalary() { return salary; }
    public void setSalary(double salary) { this.salary = salary; }
    @Override
    public String toString() {
        return "Employee{id=" + id + ", name='" + name + "', position='" +
position + "', salary=" + salary + '}';
    }
}
```



6. Test the Application

```
import java.util.List;
public class Main {

        public static void main(String[] args) {
       // Add employees
       EmployeeDAO.addEmployee("Alice Cooper", "Developer", 70000);
       EmployeeDAO.addEmployee("Bob Marley", "Manager", 80000);

       // Update employee
       EmployeeDAO.updateEmployee(1, "John Doe", "Senior Software Engineer",
90000);

        // Get all employees
       List<Employee> employees = EmployeeDAO.getAllEmployees();
       employees.forEach(System.out::println);

       // Delete employee
       EmployeeDAO.deleteEmployee(2);
        }

}
```



7. Run the Application