

**UNIVERSITI MALAYSIA TERENGGANU**

**CSM3023 – WEB PROGRAMMING 2**

**BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONORS**

**LAB 7 – JSP: Perform Create, Update, Retrieve and Delete (CRUD)**

**SEMESTER II 2023/2024**

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(S66355)

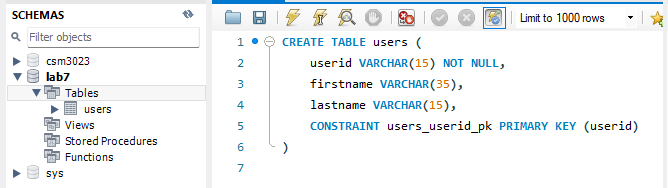
Link Github :

<https://github.com/arifhaikal2001/CSM3023-LAB-7.git>

**Step 1 - Create table users in CSF3107 database schema**

Create Database in Workbench :

|  |
| --- |
| CREATE TABLE users (  userid VARCHAR(15) NOT NULL,  firstname VARCHAR(35),  lastname VARCHAR(15),  CONSTRAINT users\_userid\_pk PRIMARY KEY (userid)  ) |



**Step 2 - Create three Java class that representing User (act as a JavaBeans to represent business object), DBConnection (to open and close database connection) and UserDao (act as a Data Access Object (DAO)) to perform CRUD process**

**User.java**

|  |
| --- |
| package com.model;  /\*\*  \*  \* @author ARIF HAIKAL  \*/  public class User {  private String userid;  private String firstName;  private String lastName;      public String getUserid() {  return userid;  }    public void setUserid(String userid) {  this.userid = userid;  }      public String getFirstName() {  return firstName;  }    public void setFirstName(String firstName) {  this.firstName = firstName;  }      public String getLastName() {  return lastName;  }    public void setLastName(String lastName) {  this.lastName = lastName;  }  } |

**DBConnection.java**

|  |
| --- |
| package com.util;  import java.io.IOException;  import java.sql.Connection;  import java.sql.DriverManager;  import java.sql.SQLException;  /\*\*  \*  \* @author ARIF HAIKAL  \*/  public class DBConnection {  private static Connection myConnection = null;  private static String myURL = myURL = "jdbc:mysql://localhost:3306/lab7";  DBConnection() {    }    public static Connection getConnection() throws ClassNotFoundException  {  if (myConnection != null)  {  return myConnection;  }  else  try  {  Class.forName("com.mysql.jdbc.Driver");  myConnection = DriverManager.getConnection(myURL, "root", "admin@123");  }  catch (SQLException e)  {  e.printStackTrace();  }  return myConnection;  }  } |

**UserDao.java**

|  |
| --- |
| package com.dao;  import java.sql.Connection;  import java.sql.PreparedStatement;  import java.sql.ResultSet;  import java.sql.SQLException;  import java.sql.Statement;  import java.util.ArrayList;  import java.util.List;  import com.model.User;  import com.util.DBConnection;  /\*\*  \*  \* @author ARIF HAIKAL  \*/  public class UserDao {  private Connection connection;    public UserDao() throws ClassNotFoundException {  connection = DBConnection.getConnection();  }      public void addUser(User user) {  try {  PreparedStatement preparedStatement = connection  .prepareStatement("insert into users(userid, firstname, lastname) values (?, ?, ?)");    preparedStatement.setString(1, user.getUserid());  preparedStatement.setString(2, user.getFirstName());  preparedStatement.setString(3, user.getLastName());  preparedStatement.executeUpdate();    } catch (SQLException e) {  e.printStackTrace();  }  }      public void deleteUser(String userId) {  try {  PreparedStatement preparedStatement = connection  .prepareStatement("delete from users where userid=?");    preparedStatement.setString(1, userId);  preparedStatement.executeUpdate();    } catch (SQLException e) {  e.printStackTrace();  }  }      public void updateUser(User user) {  try {  PreparedStatement preparedStatement = connection  .prepareStatement("update users set firstname=?, lastname=? " + "where userid=?");    preparedStatement.setString(1, user.getFirstName());  preparedStatement.setString(2, user.getLastName());  preparedStatement.setString(3, user.getUserid());  preparedStatement.executeUpdate();    } catch (SQLException e) {  e.printStackTrace();  }  }      public List<User> getAllUsers() {  List<User> users = new ArrayList<>();  try {  Statement statement = connection.createStatement();  ResultSet rs = statement.executeQuery("SELECT \* FROM users");  while (rs.next()) {  User user = new User();  user.setUserid(rs.getString("userid"));  user.setFirstName(rs.getString("firstname"));  user.setLastName(rs.getString("lastname"));  users.add(user);  }  } catch (SQLException e) {  e.printStackTrace();  }  return users;  }    public User getUserById(String userId) {  User user = new User();  try {  PreparedStatement preparedStatement = connection  .prepareStatement("SELECT \* FROM users WHERE userid=?");  preparedStatement.setString(1, userId);  ResultSet rs = preparedStatement.executeQuery();  if (rs.next()) {  user.setUserid(rs.getString("userid"));  user.setFirstName(rs.getString("firstname"));  user.setLastName(rs.getString("lastname"));  }  } catch (SQLException e) {  e.printStackTrace();  }  return user;  }  } |

**Step 3 - Create UserController servlet in order to control and redirect the request to the respective CRUD process and page**

**UserController.java**

|  |
| --- |
| package com.controller;  /\*\*  \*  \* @author McBois  \*/  import java.io.IOException;  import jakarta.servlet.ServletException;  import jakarta.servlet.annotation.WebServlet;  import jakarta.servlet.http.HttpServlet;  import jakarta.servlet.http.HttpServletRequest;  import jakarta.servlet.http.HttpServletResponse;  import jakarta.servlet.RequestDispatcher;  import com.dao.UserDao;  import com.model.User;  @WebServlet(name = "UserController", urlPatterns = {"/UserController"})  public class UserController extends HttpServlet {  private static final String INSERT = "/user.jsp";  private static final String EDIT = "/editUser.jsp";  private static final String LIST\_USER = "/listUser.jsp";  private UserDao dao;    public UserController() throws ClassNotFoundException {  super();  dao = new UserDao();  }  @Override  protected void doGet(HttpServletRequest request, HttpServletResponse response)  throws ServletException, IOException {  String forward = "";  String action = request.getParameter("action");    if (action.equalsIgnoreCase("delete")) {  String userId = request.getParameter("userId");  dao.deleteUser(userId);  forward = LIST\_USER;  request.setAttribute("users", dao.getAllUsers());  } else if (action.equalsIgnoreCase("edit")) {  forward = EDIT;  String userId = request.getParameter("userId");  User user = dao.getUserById(userId);  request.setAttribute("user", user);  } else if (action.equalsIgnoreCase("listUser")) {  forward = LIST\_USER;  request.setAttribute("users", dao.getAllUsers());  } else {  forward = INSERT;  }  RequestDispatcher view = request.getRequestDispatcher(forward);  view.forward(request, response);  }  @Override  protected void doPost(HttpServletRequest request, HttpServletResponse response)  throws ServletException, IOException {  String action = request.getParameter("action");  User user = new User();  user.setUserid(request.getParameter("userid"));  user.setFirstName(request.getParameter("firstName"));  user.setLastName(request.getParameter("lastName"));    if ("edit".equalsIgnoreCase(action)) {  dao.updateUser(user);  } else {  dao.addUser(user);  }    RequestDispatcher view = request.getRequestDispatcher(LIST\_USER);  request.setAttribute("users", dao.getAllUsers());  view.forward(request, response);  }  @Override  public String getServletInfo() {  return "UserController Servlet";  }  } |

**Step 4 - Create an index.jsp page that act as a main page**

**index.jsp**

|  |
| --- |
| <%--  Document : index  Created on : 10 Jun 2024, 12:50:24 am  Author : McBois  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <!DOCTYPE html>  <html>  <head>  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">  <title>Sample Perform CRUD Using Java Servlet</title>  </head>  <body>  <h1>Sample Perform CRUD Using Java Servlet!</h1>  <jsp:forward page="/UserController?action=listUser" />  </body>  </html> |

**Step 5 - Create listUser.jsp page to perform retrieving of a list of users.**

**listUser.jsp**

|  |
| --- |
| <%--  Document : listUser  Created on : 10 Jun 2024, 12:50:42 am  Author : McBois  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>  <%@taglib uri="http://java.sun.com/jsp/jstl/fmt" prefix="fmt" %>  <!DOCTYPE html>  <html>  <head>  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">  <title>User List</title>  </head>  <body>  <h1>List of Users</h1>  <table border="1">  <thead>  <tr>  <th>User ID</th>  <th>First Name</th>  <th>Last Name</th>  <th colspan="2">Action</th>  </tr>  </thead>  <tbody>  <c:forEach items="${users}" var="user">  <tr>  <td><c:out value="${user.userid}" /></td>  <td><c:out value="${user.firstName}" /></td>  <td><c:out value="${user.lastName}" /></td>  <td><a href="UserController?action=edit&userId=${user.userid}">Update</a></td>  <td><a href="UserController?action=delete&userId=${user.userid}">Delete</a></td>  </tr>  </c:forEach>  </tbody>  </table>  <p><a href="UserController?action=insert">Add User</a></p>  </body>  </html> |

**Step 6 - Create user.jsp page as a page for creating new record for user.**

**user.java**

|  |
| --- |
| <%--  Document : User  Created on : 10 Jun 2024, 12:51:02 am  Author : McBois  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <!DOCTYPE html>  <html>  <head>  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">  <title>New Record</title>  </head>  <body>  <p><b>New Record</b></p>  <form name="frmAddUser" action="UserController" method="POST">  <table border="0">  <tbody>  <tr>  <td>User ID:</td>  <td><input type="text" name="userid" size="25" required /></td>  </tr>  <tr>  <td>First Name:</td>  <td><input type="text" name="firstName" size="40" /></td>  </tr>  <tr>  <td>Last Name:</td>  <td><input type="text" name="lastName" size="40" /></td>  </tr>  <tr>  <td><input type="submit" value="Submit" name="submit" /></td>  <td><input type="reset" value="Cancel" name="cancel" /></td>  </tr>  </tbody>  </table>  </form>  </body>  </html> |

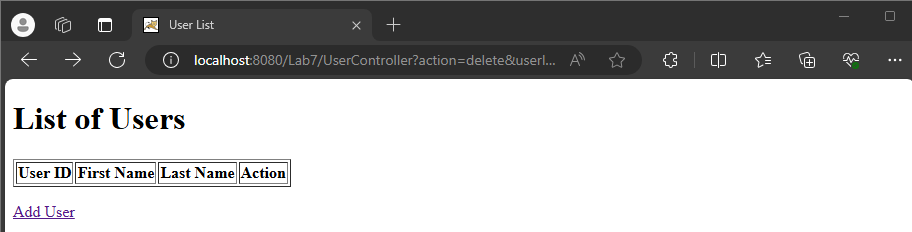
**Step 7 - Create editUser.jsp page as a page for updating existing record for**

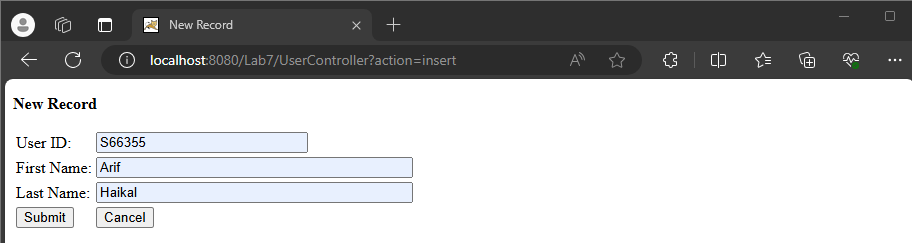
**specific user.**

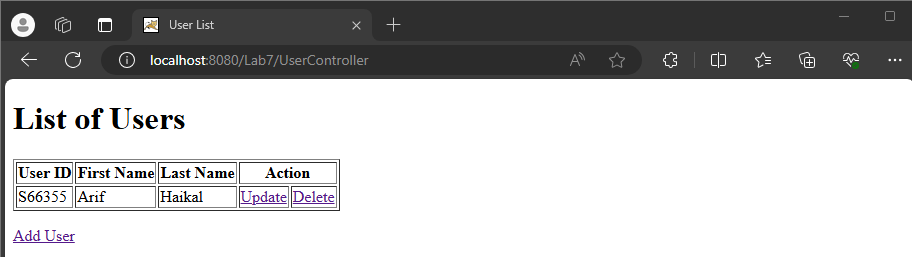
**editUser.java**

|  |
| --- |
| <%--  Document : editUser  Created on : 10 Jun 2024, 12:51:33 am  Author : McBois  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <%@taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>  <%@taglib uri="http://java.sun.com/jsp/jstl/fmt" prefix="fmt" %>  <!DOCTYPE html>  <html>  <head>  <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">  <title>Edit User</title>  </head>  <body>  <p>Updating User Profile</p>  <form name="frmEditUser" action="UserController" method="POST">  <table border="0">  <tbody>  <tr>  <td>User ID:</td>  <td><input type="text" name="userid" readonly="readonly" value="<c:out value='${user.userid}' />" size="25" /></td>  </tr>  <tr>  <td>First Name:</td>  <td><input type="text" name="firstName" value="<c:out value='${user.firstName}' />" size="40" /></td>  </tr>  <tr>  <td>Last Name:</td>  <td><input type="text" name="lastName" value="<c:out value='${user.lastName}' />" size="40" /></td>  </tr>  <tr>  <td><input type="hidden" name="action" value="edit" /></td>  </tr>  <tr>  <td><input type="submit" name="Submit" value="submit" /></td>  </tr>  </tbody>  </table>  </form>  </body>  </html> |

Output :

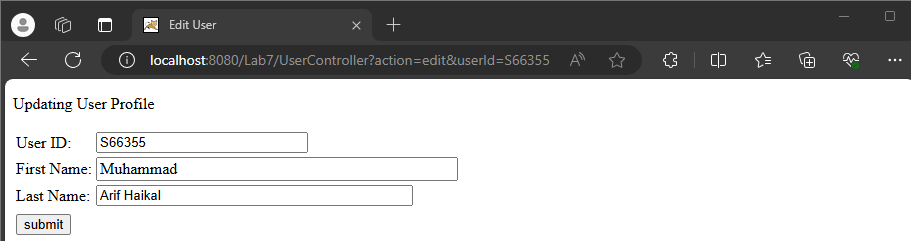


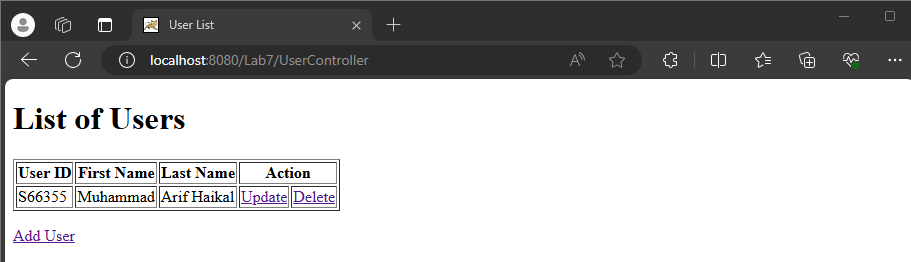


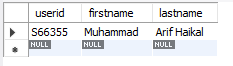




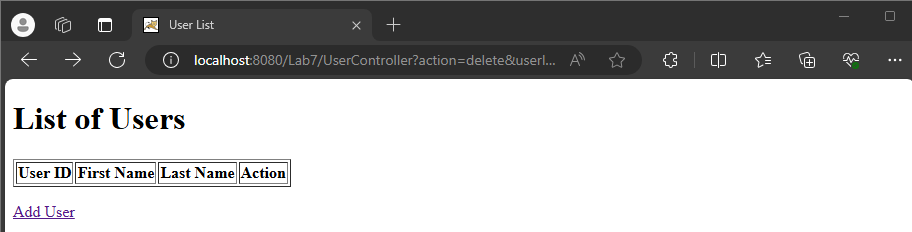
Update :







Delete :





**Reflection:**

1. Why we use servlet for Java Web Application?

Servlets allow the server to manage client requests and provide dynamic web content, we utilise them for Java web applications. Servlets are necessary for developing responsive and interactive web applications because they handle incoming requests, communicate with databases or other resources, and return results to the client.

**Exercise**

**Q1) Implement profile registration using servlet**

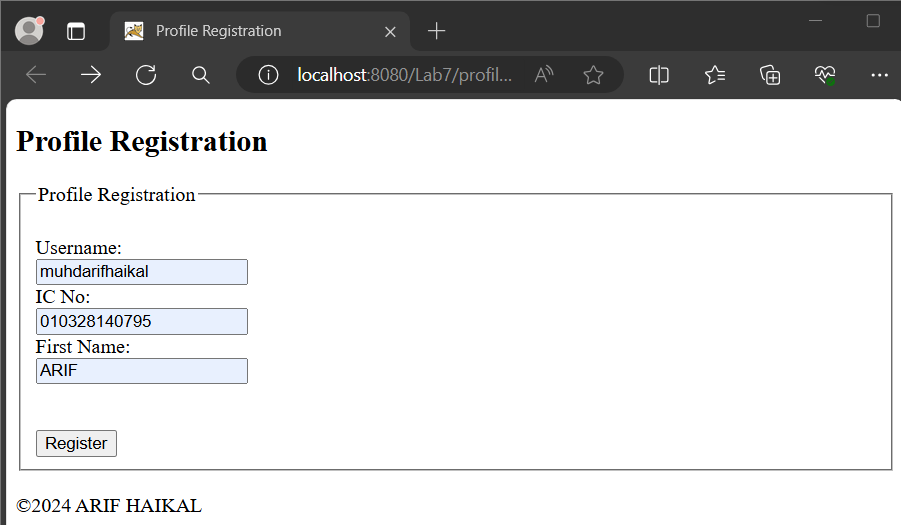
**profileForm.html**

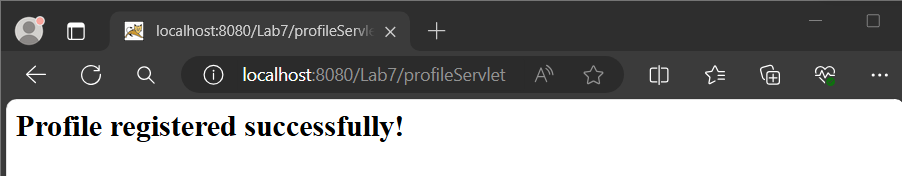
|  |
| --- |
| <!DOCTYPE html>  <html>  <head>  <title>Profile Registration</title>  </head>  <body>  <h2>Profile Registration</h2>  <fieldset>  <legend>Profile Registration</legend>  <form action="profileServlet" method="post">  Username: <br><input type="text" name="username" maxlength="15" required><br>  IC No: <br><input type="text" name="icno" maxlength="15" required><br>  First Name: <br><input type="text" name="firstname" maxlength="50" required><br>  <br>  <input type="submit" value="Register">  </form>  </fieldset>  <br>  </body>  <footer>  &copy;2024 ARIF HAIKAL  </footer>  </html> |

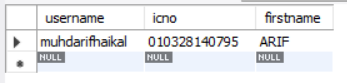
**profileServlet.java**

|  |
| --- |
| package com.exercise;  import java.io.IOException;  import java.io.PrintWriter;  import java.sql.Connection;  import java.sql.DriverManager;  import java.sql.PreparedStatement;  import java.sql.SQLException;  import jakarta.servlet.ServletException;  import jakarta.servlet.annotation.WebServlet;  import jakarta.servlet.http.HttpServlet;  import jakarta.servlet.http.HttpServletRequest;  import jakarta.servlet.http.HttpServletResponse;  /\*\*  \*  \* @author ARIF HAIKAL  \*/  @WebServlet("/profileServlet")  public class profileServlet extends HttpServlet {    private static final long serialVersionUID = 1L;  // Database connection details  private static final String JDBC\_DRIVER = "com.mysql.cj.jdbc.Driver";  private static final String DB\_URL = "jdbc:mysql://localhost:3306/CSM3023";  private static final String DB\_USER = "root";  private static final String DB\_PASSWORD = "admin@123";  protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {  String username = request.getParameter("username");  String icno = request.getParameter("icno");  String firstname = request.getParameter("firstname");  Connection conn = null;  PreparedStatement stmt = null;  response.setContentType("text/html");  PrintWriter out = response.getWriter();  try {  // Load the JDBC driver  Class.forName(JDBC\_DRIVER);  // Connect to the database  conn = DriverManager.getConnection(DB\_URL, DB\_USER, DB\_PASSWORD);  // Prepare SQL query  String sql = "INSERT INTO userprofile (username, icno, firstname) VALUES (?, ?, ?)";  stmt = conn.prepareStatement(sql);  stmt.setString(1, username);  stmt.setString(2, icno);  stmt.setString(3, firstname);  // Execute SQL query  int rows = stmt.executeUpdate();  // Generate response  if (rows > 0) {  out.println("<h2>Profile registered successfully!</h2>");  } else {  out.println("<h2>Error registering profile!</h2>");  }  } catch (ClassNotFoundException e) {  out.println("<h2>JDBC Driver not found!</h2>");  e.printStackTrace(out);  } catch (SQLException e) {  out.println("<h2>Database error!</h2>");  e.printStackTrace(out);  } finally {  try {  if (stmt != null) stmt.close();  if (conn != null) conn.close();  } catch (SQLException se) {  se.printStackTrace(out);  }         }      }  } |

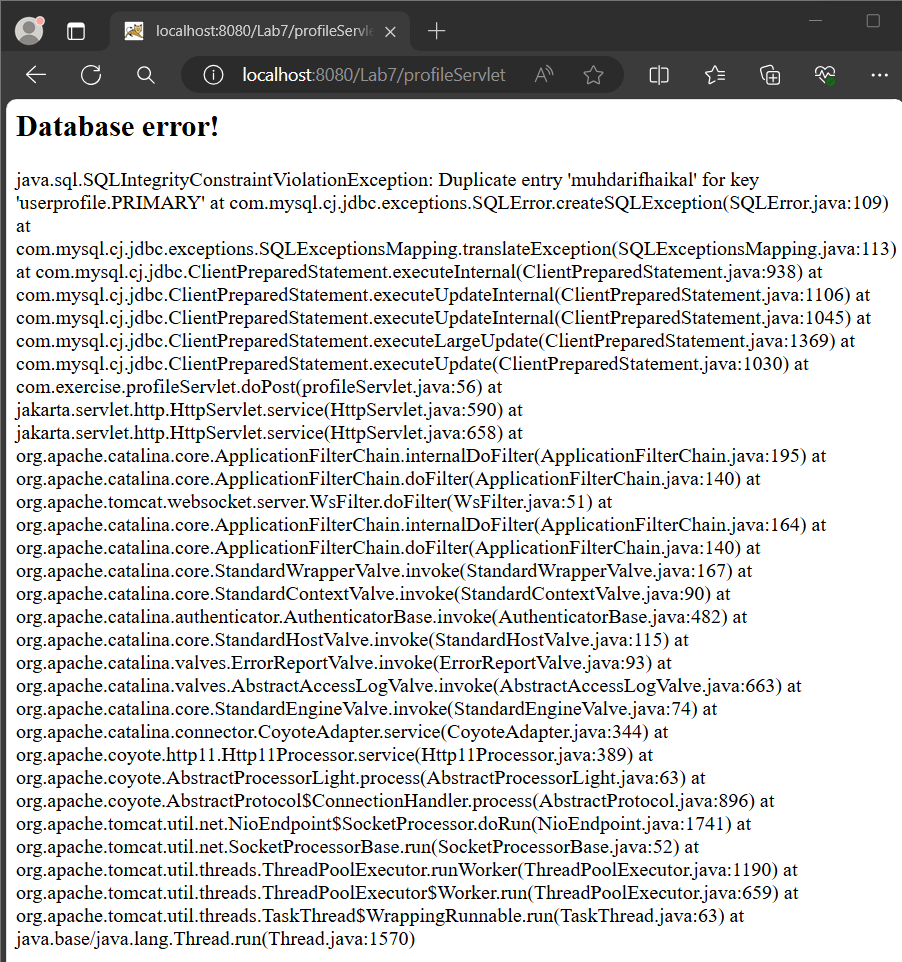
Output :







When you duplicate :



**Q2) Applying session in student registration.**

**studentRegister.jsp**

|  |
| --- |
| <%--  Document : studentRegister  Created on : 7 Jun 2024, 5:21:13 pm  Author : ARIF HAIKAL  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <!DOCTYPE html>  <html>  <head>  <title>Student Registration</title>  </head>  <body>  <h2>Student Registration</h2>  <fieldset>  <legend>Student Registration</legend>  <form action="confirmRegister.jsp" method="post">  Student ID: <br><input type="text" name="studentid" required><br>  Name: <br><input type="text" name="name" required><br>  <br>  <input type="submit" value="Submit">  </form>  </fieldset>  <br>  </body>  <footer>  &copy;2024 ARIF HAIKAL  </footer>  </html> |

**confirmRegister.jsp**

|  |
| --- |
| <%--  Document : confirmRegister  Created on : 7 Jun 2024, 5:20:04 pm  Author : ARIF HAIKAL  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <%@ page import="jakarta.servlet.http.HttpSession" %>  <%  String studentid = request.getParameter("studentid");  String name = request.getParameter("name");  // Use the implicit session object directly without declaring it  session.setAttribute("studentid", studentid);  session.setAttribute("name", name);  %>  <!DOCTYPE html>  <html>  <head>  <title>Confirm Registration</title>  </head>  <body>  <h2>Confirm Registration</h2>  <fieldset>  <p>Student ID: <%= studentid %></p>  <p>Name: <%= name %></p>  </fieldset>  <br>  <form action="notificationRegister.jsp" method="post">  <input type="submit" value="Proceed">  </form>  </body>  </html> |

**notificationRegister.jsp**

|  |
| --- |
| <%--  Document : notificationRegister  Created on : 5 Jun 2024, 3:43:09 pm  Author : ARIF HAIKAL  --%>  <%@page contentType="text/html" pageEncoding="UTF-8"%>  <%@ page import="jakarta.servlet.http.HttpSession" %>  <%  // Use the implicit session object directly without declaring it  HttpSession currentSession = request.getSession(false);  if (currentSession == null || currentSession.getAttribute("studentid") == null || currentSession.getAttribute("name") == null) {  response.sendRedirect("studentRegister.jsp");  return;  }  String studentid = (String) currentSession.getAttribute("studentid");  String name = (String) currentSession.getAttribute("name");  currentSession.invalidate();  %>  <!DOCTYPE html>  <html>  <head>  <title>Registration Notification</title>  </head>  <body>  <h2>Registration Notification</h2>  <fieldset>  <p>Student ID: <%= studentid %></p>  <p>Name: <%= name %></p>  <p>Your registration has been successfully completed.</p>  </fieldset>  </body>  <br>  <footer>  &copy;2024 ARIF HAIKAL  </footer>  </html> |

Output :

