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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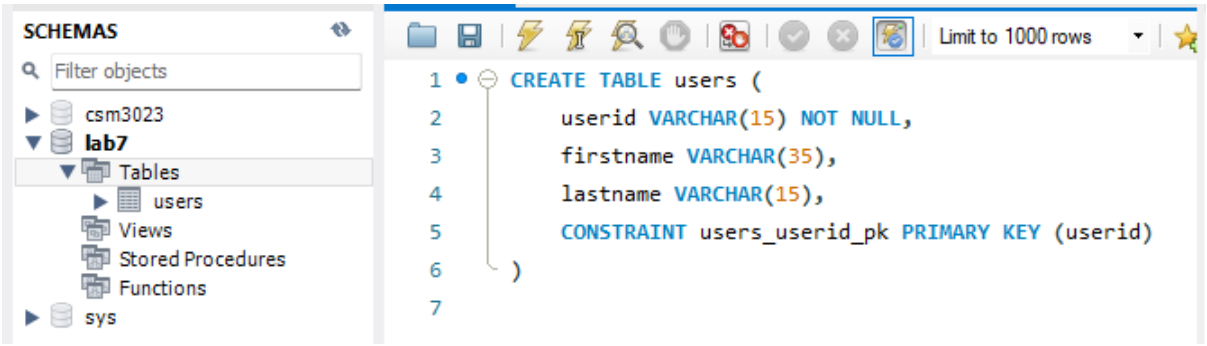
Link Github :

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

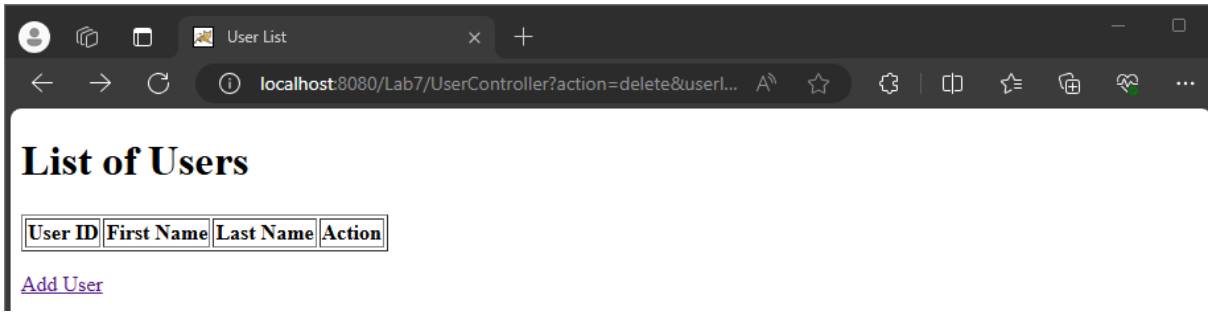
```
<%--
    Document   : User
    Created on : 10 Jun 2024, 12:51:02 am
    Author     : McBois
--%>

<%@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>
```

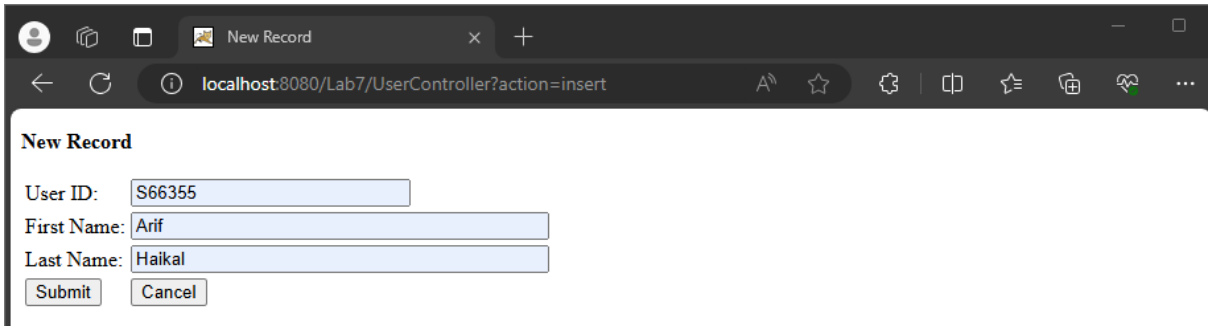
Step 7 - Create editUser.jsp page as a page for updating existing record for specific user.

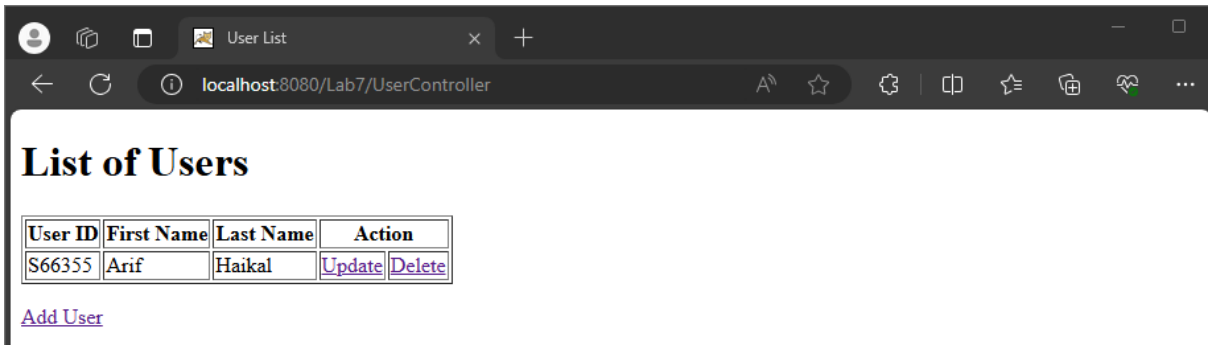
editUser.java

```
<%--
    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 :

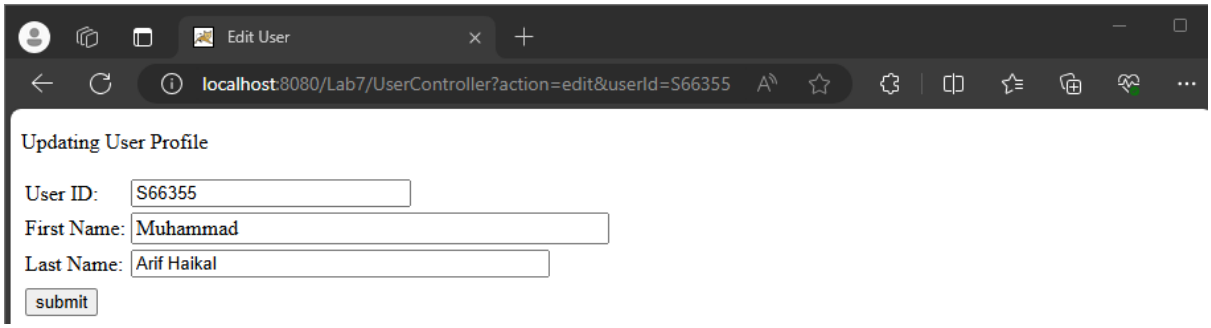

User List
localhost:8080/Lab7/UserController?action=delete&userI...
List of Users
User ID
First Name
Last Name
Action
Add User

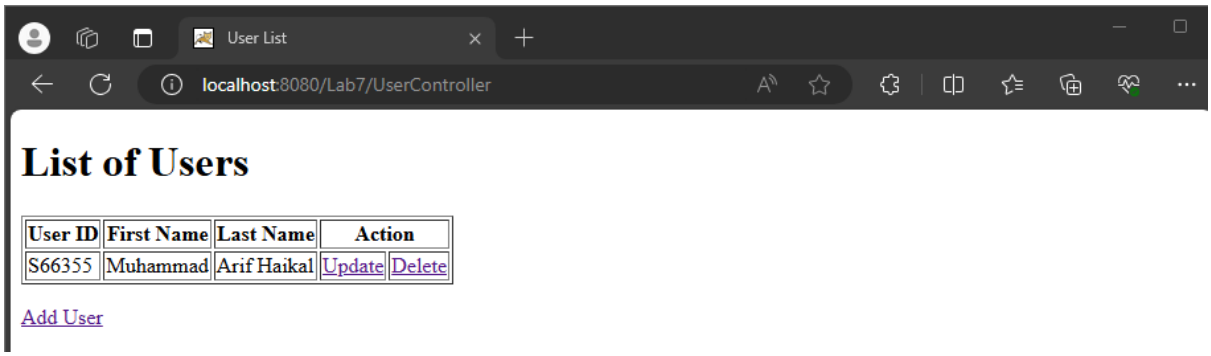

New Record
localhost:8080/Lab7/UserController?action=insert
New Record
User ID: S66355
First Name: Arif
Last Name: Haikal
Submit
Cancel

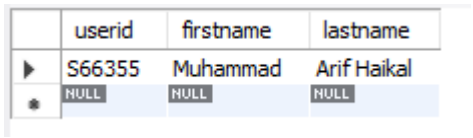

User List
localhost:8080/Lab7/UserController
List of Users
User ID
First Name
Last Name
Action
S66355
Arif
Haikal
Update
Delete
Add User


userid
firstname
lastname
S66355
Arif
Haikal
NULL
NULL
NULL

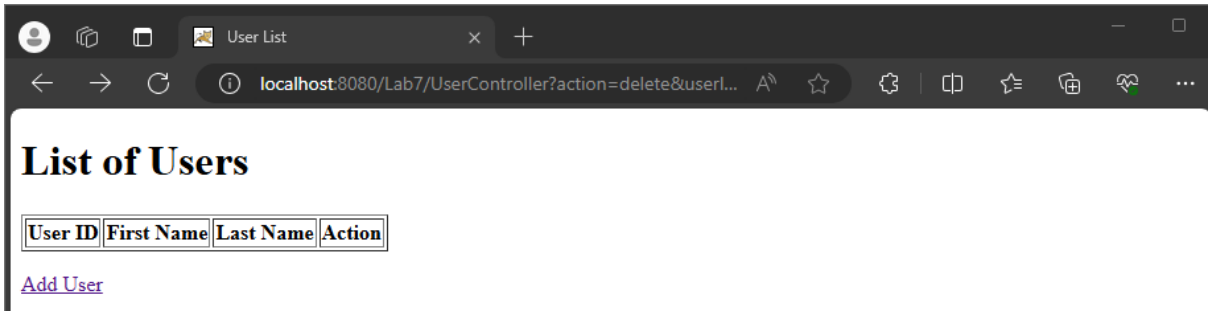
Update :

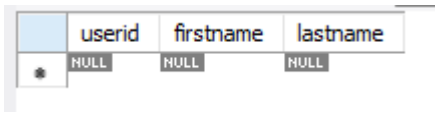






Delete :





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

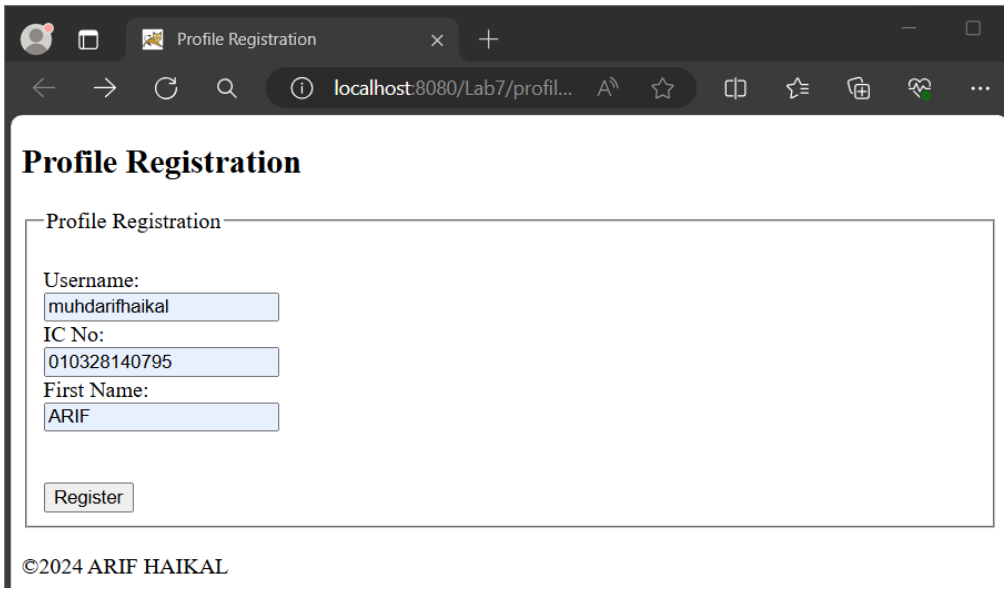
```
<!DOCTYPE html>
<html>
<head>
    <title>Profile Registration</title>
</head>
<body>
    <h2>Profile Registration</h2>
    <fieldset>
        <legend>Profile Registration</legend>
        <form action="profileServlet" method="post">
            Username: <br><input type="text" name="username" maxlength="15"
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>
```

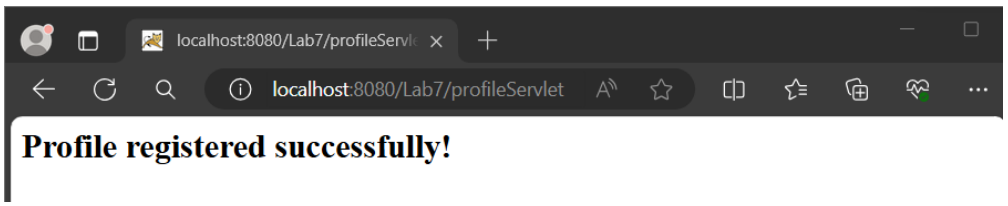
profileServlet.java

```
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);
            }
        }
    }
}
```

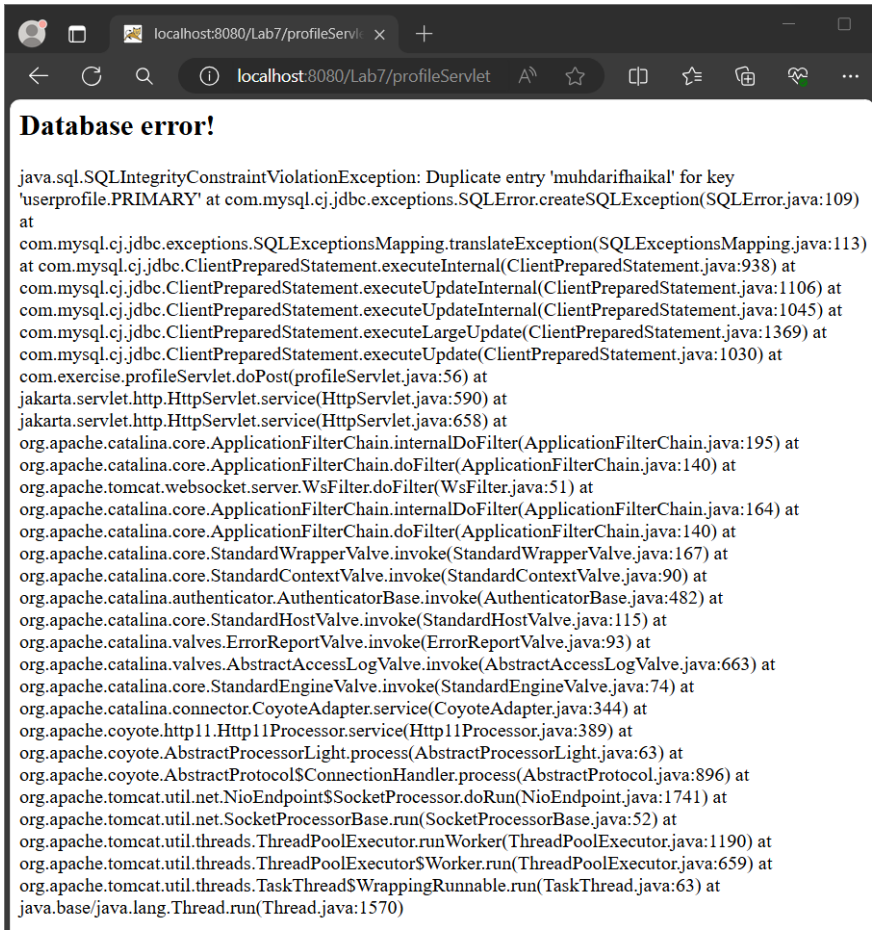
Output :





	username	icno	firstname
▶	muhdarifhaikal	010328140795	ARIF
*	NULL	NULL	NULL

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>
```

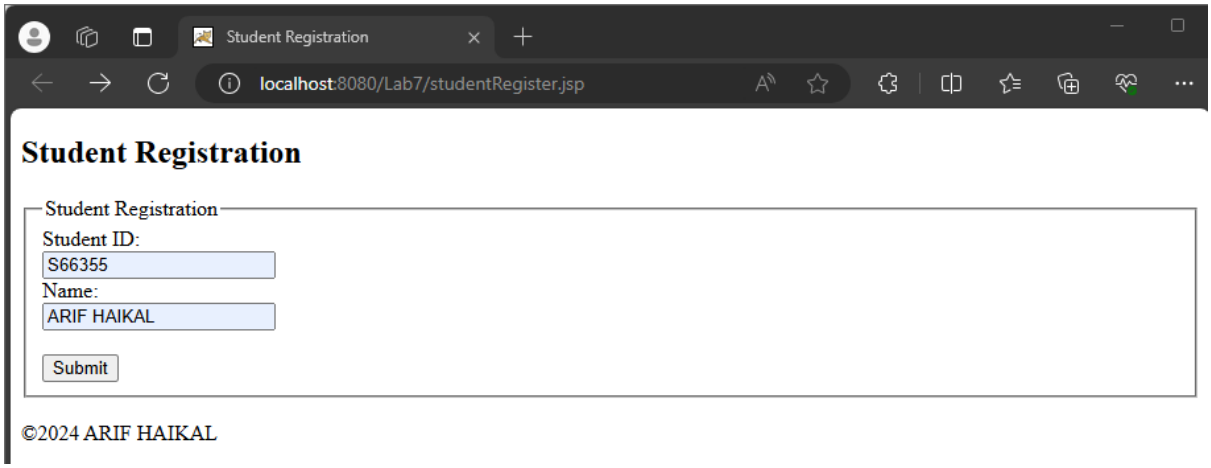
confirmRegister.jsp

```
<%--
    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 :


Student Registration
localhost:8080/Lab7/studentRegister.jsp
Student Registration
Student Registration
Student ID:
S66355
Name:
ARIF HAIKAL
Submit
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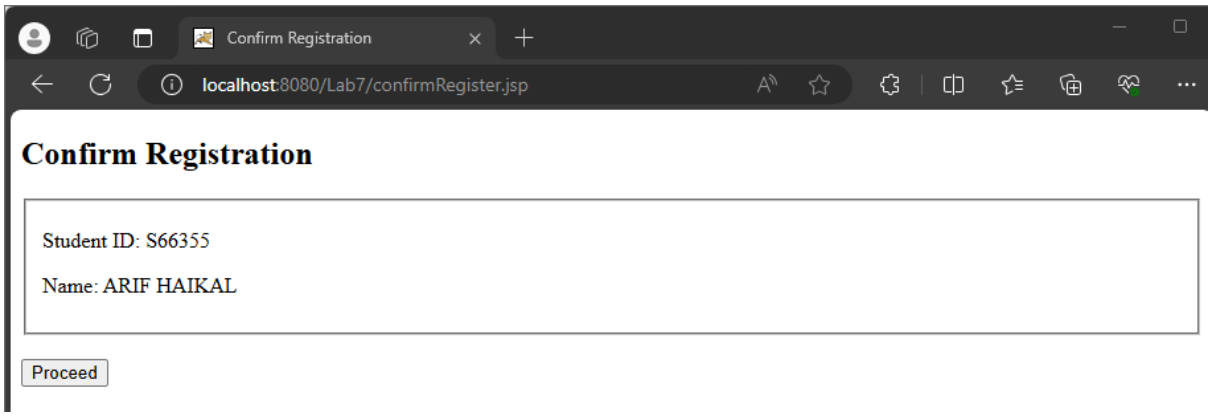
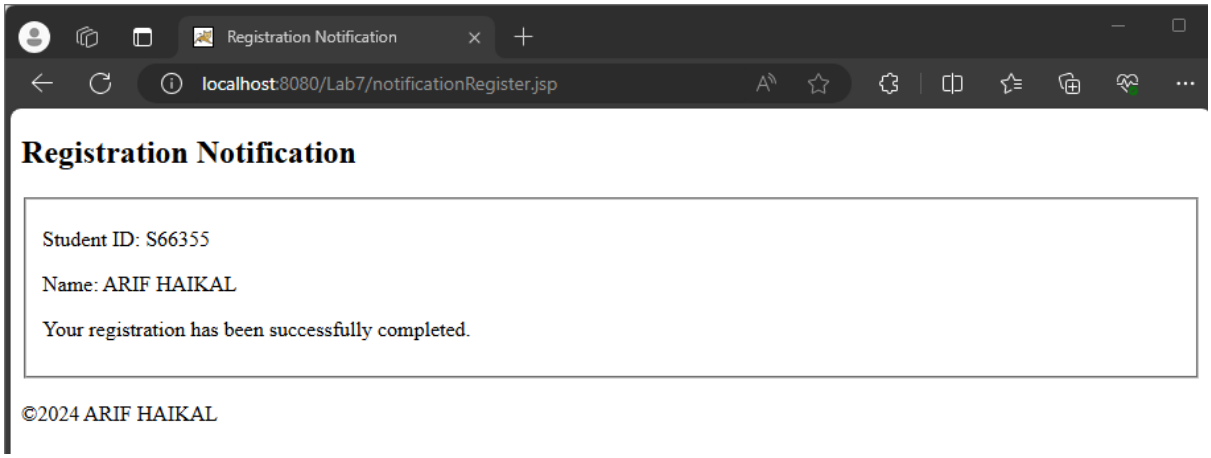

Confirm Registration
localhost:8080/Lab7/confirmRegister.jsp
Confirm Registration
Student ID: S66355
Name: ARIF HAIKAL
Proceed


Registration Notification
localhost:8080/Lab7/notificationRegister.jsp
Registration Notification
Student ID: S66355
Name: ARIF HAIKAL
Your registration has been successfully completed.
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