



UNIVERSITI MALAYSIA TERENGGANU
FACULTY OF COMPUTER SCIENCE AND MATHEMATICS

CSM3023 – WEB BASED APPLICATION DEVELOPMENT
LAB REPORT 7 – JSP : PERFORM CREATE, UPDATE, RETRIEVE AND
DELETE (CRUD)

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TASK 1 : PERFORM BASIC CRUD PROCESS USING JAVA SERVLET

Objective :

- Using Java Servlet to perform creating, retrieving, updating and deleting (CRUD) records from MySQL database.

User.java

```
5   package com.model;
6
7   public class User {
8       private String userId;
9       private String firstName;
10      private String lastName;
11
12      public String getUserId() {
13          return userId;
14      }
15
16      public void setUserId(String userId) {
17          this.userId = userId;
18      }
19
20      public String getFirstName() {
21          return firstName;
22      }
23
24      public void setFirstName(String firstName) {
25          this.firstName = firstName;
26      }
27
28      public String getLastName() {
29          return lastName;
30      }
31
32      public void setLastName(String lastName) {
33          this.lastName = lastName;
34      }
35
36  }
```

DBConnection.java

```
13 public class DBConnection {
14     private static Connection myConnection=null;
15     private static String myUrl=myUrl = "jdbc:mysql://localhost:3306/csm3023";
16
17     DBConnection(){
18     }
19
20     public static Connection getConnection() throws ClassNotFoundException{
21         if(myConnection != null)
22         {
23             return myConnection;
24         }
25         else
26         {
27             try{
28                 Class.forName("com.mysql.jdbc.Driver");
29                 myConnection = DriverManager.getConnection(myUrl, "root", "admin");
30             }
31             catch (SQLException e)
32             {
33                 e.printStackTrace();
34             }
35             return myConnection;
36         }
37     }
38
39     public void closeConnection() throws ClassNotFoundException{
40         try{
41             myConnection.close();
42         }
43         catch(SQLException e){
44             e.printStackTrace();
45         }
46     }
47 }
```

com.util.DBConnection >

userDao.java

```
5 package com.dao;
6
7 import java.sql.Connection;
8 import java.sql.PreparedStatement;
9 import java.sql.ResultSet;
10 import java.sql.SQLException;
11 import java.sql.Statement;
12 import java.util.ArrayList;
13 import com.model.User;
14 import com.util.DBConnection;
15 import java.util.List;
16
17 public class UserDao {
18     private Connection connection;
19
20     public UserDao() throws ClassNotFoundException {
21         connection = DBConnection.getConnection();
22     }
23
24     public void addUser(User user){
25         try {
26             PreparedStatement preparedStatement = connection.prepareStatement("insert into users(userid, firstname, lastname) values (?, ?, ?)");
27             preparedStatement.setString(1, user.getUserId());
28             preparedStatement.setString(2, user.getFirstName());
29             preparedStatement.setString(3, user.getLastName());
30             preparedStatement.executeUpdate();
31         } catch (SQLException e) {
32             e.printStackTrace();
33         }
34     }
35 }
```

```

36 public void deleteUser(String userId) {
37     try {
38         PreparedStatement preparedStatement = connection.prepareStatement("delete from users where userid=?");
39         preparedStatement.setString(1, userId);
40         preparedStatement.executeUpdate();
41     } catch (SQLException e) {
42         e.printStackTrace();
43     }
44 }
45
46 public void updateUser(User user) {
47     try {
48         PreparedStatement preparedStatement = connection.prepareStatement("update users set firstname=?, lastname=? where userid=?");
49         preparedStatement.setString(1, user.getFirstName());
50         preparedStatement.setString(2, user.getLastName());
51         preparedStatement.setString(3, user.getUserId());
52         preparedStatement.executeUpdate();
53     } catch (SQLException e) {
54         e.printStackTrace();
55     }
56 }

```

```

78 public User getUserById(String userId) {
79     User user = new User();
80     try {
81         PreparedStatement preparedStatement = connection.prepareStatement("select * from users where userid=?");
82         preparedStatement.setString(1, userId);
83         ResultSet rs = preparedStatement.executeQuery();
84
85         while (rs.next()) {
86             user.setUserId(rs.getString("userid"));
87             user.setFirstName(rs.getString("firstname"));
88             user.setLastName(rs.getString("lastname"));
89         }
90     } catch (SQLException e) {
91         e.printStackTrace();
92     }
93
94     return user;
95 }
96 }

```

UserController.java

```

5 package com.controller;
6
7 import java.io.IOException;
8 import java.io.PrintWriter;
9 import java.text.ParseException;
10 import jakarta.servlet.ServletException;
11 import jakarta.servlet.annotation.WebServlet;
12 import jakarta.servlet.http.HttpServlet;
13 import jakarta.servlet.http.HttpServletRequest;
14 import jakarta.servlet.http.HttpServletResponse;
15
16 import com.dao.UserDao;
17 import com.model.User;
18 import jakarta.servlet.RequestDispatcher;
19
20 @WebServlet(name = "UserController", urlPatterns = {"/UserController"})
21 public class UserController extends HttpServlet {

```

```

    private static String INSERT = "/user.jsp";
    private static String EDIT = "/editUser.jsp";
    private static String LIST_USER = "/listUser.jsp";
    private UserDao dao;

```

```

37
38 public UserController() throws ClassNotFoundException {
39     super();
40     dao = new UserDao();
41 }

```

```

53  @Override
54  protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
55      String action = request.getParameter("action");
56      String forward = "";
57
58      if (action.equalsIgnoreCase("delete")) {
59          String userId = request.getParameter("userId");
60          dao.deleteUser(userId);
61          forward = LIST_USER;
62          request.setAttribute("users", dao.getAllUsers());
63      } else if (action.equalsIgnoreCase("edit")) {
64          String userId = request.getParameter("userId");
65          User user = dao.getUserById(userId);
66          forward = EDIT;
67          request.setAttribute("user", user);
68      } else if (action.equalsIgnoreCase("listUser")) {
69          forward = LIST_USER;
70          request.setAttribute("users", dao.getAllUsers());
71      } else if (action.equalsIgnoreCase("insert")) {
72          forward = INSERT;
73      }
74
75      RequestDispatcher view = request.getRequestDispatcher(forward);
76      view.forward(request, response);
77  }

```

```

87  @Override
88  protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
89      String action = request.getParameter("action");
90
91      User user = new User();
92      user.setUserId(request.getParameter("userid"));
93      user.setFirstName(request.getParameter("firstName"));
94      user.setLastName(request.getParameter("lastName"));
95
96      if (action.equalsIgnoreCase("edit")) {
97          dao.updateUser(user);
98      } else {
99          dao.addUser(user);
100      }
101
102      RequestDispatcher view = request.getRequestDispatcher(LIST_USER);
103      request.setAttribute("users", dao.getAllUsers());
104      view.forward(request, response);
105  }
106  }
107  }

```

Index.jsp

```

1  <%--
2      Document      : index
3      Created on   : 29 May 2024, 3:52:00 pm
4      Author      : user
5  --%>
6
7  <%@page contentType="text/html" pageEncoding="UTF-8"%>
8  <!DOCTYPE html>
9  <html>
10     <head>
11         <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12         <title>Sample Perform CRUD Using Java Servlet!</title>
13     </head>
14     <body>
15         <h1>Sample Perform CRUD Using Java Servlet!</h1>
16         <jsp:forward page="/UserController?action=listUser"/>
17     </body>
18 </html>

```

listUser.jsp

```
1  <%--
2      Document    : listUser
3      Created on  : Jun 1, 2024, 3:04:04 PM
4      Author     : User
5  --%>
6
7  <%@ page contentType="text/html" pageEncoding="UTF-8" %>
8  <%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>
9  <%@ taglib uri="http://java.sun.com/jsp/jstl/fmt" prefix="fmt" %>
10 <!DOCTYPE html>
11 <html>
12 <head>
13     <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
14     <title>User Lists</title>
15 </head>
16 <body>
17     <p>List of Users</p>
18     <table border="1">
19         <thead>
20             <tr>
21                 <th>User Id</th>
22                 <th>First Name</th>
23                 <th>Last Name</th>
24                 <th colspan="2">Action</th>
25             </tr>
26         </thead>
27
28         <tbody>
29             <c:forEach var="user" items="${users}">
30                 <tr>
31                     <td><c:out value="${user.userId}"/></td>
32                     <td><c:out value="${user.firstName}"/></td>
33                     <td><c:out value="${user.lastName}"/></td>
34                     <td>
35                         <a href="UserController?action=edit&userId=<c:out value="${user.userId}"/>">Update</a>
36                     </td>
37                     <td>
38                         <a href="UserController?action=delete&userId=<c:out value="${user.userId}"/>">Delete</a>
39                     </td>
40                 </tr>
41             </c:forEach>
42         </tbody>
43     </table>
44     <br>
45     <p><a href="UserController?action=insert">Add User</a></p>
46 </body>
47 </html>
```

User.jsp

```
1 <!--
2 Document : user
3 Created on : Jun 1, 2024, 3:20:37 PM
4 Author : User
5 -->
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <!DOCTYPE html>
9 <html>
10 <head>
11 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12 <title>New Record</title>
13 </head>
14
15 <body>
16 <h1>New Record</h1>
17 <form name="frmAddUser" action="UserController" method="POST">
18 <table border="0">
19 <tbody>
20 <tr>
21 <td>User ID:</td>
22 <td><input type="text" name="userid" value="" size="25" required /></td>
23 </tr>
24 <tr>
25 <td>First Name:</td>
26 <td><input type="text" name="firstName" value="" size="40" /></td>
27 </tr>
28 <tr>
29 <td>Last Name:</td>
30 <td><input type="text" name="lastName" value="" size="40" /></td>
31 </tr>
32 <tr>
33 <td><input type="hidden" name="action" value="insert" /></td>
34 </tr>
35 <tr>
36 <td colspan="2">
37 <input type="submit" value="Submit" name="submit" />
38 <input type="reset" value="Cancel" name="cancel" />
39 </td>
40 </tr>
41 </tbody>
42 </table>
43 </form>
44 </body>
45 </html>
```

editUser.jsp

```
1 <!--
2   Document   : editUser
3   Created on : 29 May 2024, 4:07:10 pm
4   Author    : user
5   -->
6
7 <%% page contentType="text/html" pageEncoding="UTF-8" %>
8 <%% taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>
9 <%% taglib uri="http://java.sun.com/jsp/jstl/fmt" prefix="fmt" %>
10
11 <!DOCTYPE html>
12 <html>
13 <head>
14   <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
15   <title>Edit User</title>
16 </head>
17 <body>
18   <h1>Editing User Profile</h1>
19   <form name="frmEditUser" action="UserController" method="POST">
20     <table border="0">
21       <tbody>
22         <tr>
23           <td>User ID:</td>
24           <td><input type="text" name="userid" readonly value="<c:out value='${user.userId}' />" size="25" /></td>
25         </tr>
26
27         <tr>
28           <td>First Name:</td>
29           <td><input type="text" name="firstname" value="<c:out value='${user.firstName}' />" size="40" /></td>
30         </tr>
31         <tr>
32           <td>Last Name:</td>
33           <td><input type="text" name="lastname" value="<c:out value='${user.lastName}' />" size="40" /></td>
34         </tr>
35         <tr>
36           <td><input type="hidden" name="action" value="edit" /></td>
37         </tr>
38         <tr>
39           <td colspan="2">
40             <input type="submit" value="Submit" name="submit" />
41             <input type="reset" value="Cancel" name="cancel" />
42           </td>
43         </tr>
44       </tbody>
45     </table>
46   </form>
47 </body>
</html>
```

The output.

List of Users

User Id	First Name	Last Name	Action	
S46873	Fatimah	Rabiah	Update	Delete
S65784	Khairul	Azman	Update	Delete

[Add User](#)

List of Users

User Id	First Name	Last Name	Action	
S46873	Fatimah	Rabiah	Update	Delete

Add User

	userid	firstname	lastname
▶	S46873	Fatimah	Rabiah

Reflection:

1. Why we use servlet for Java Web Application?
 - We used servlet for Java Web Application because Java servlet are server-side programs which is running inside a web server's servlet engine to handle client request and dynamic response for every request.

Exercise

Q1) Implement profile registration using servlet

1. Create a table known as userprofile using database schema CF3107 using these attributes.

- username as a character length 15 and must be primary key
- icno as a character length 15
- firstname as varchar(50)

2. Create an entry form.

3. Create a servlet known as profileServlet.

4. Use profileServlet to acknowledge user about the profile registration.

profileServlet.java

```
5 package com.controller;
6
7 import java.io.IOException;
8 import java.io.PrintWriter;
9 import java.sql.Connection;
10 import java.sql.DriverManager;
11 import java.sql.PreparedStatement;
12 import java.sql.SQLException;
13 import jakarta.servlet.ServletException;
14 import jakarta.servlet.annotation.WebServlet;
15 import jakarta.servlet.http.HttpServlet;
16 import jakarta.servlet.http.HttpServletRequest;
17 import jakarta.servlet.http.HttpServletResponse;
18
19 @WebServlet(name = "profileServlet", urlPatterns = {"/profileServlet"})
20 public class profileServlet extends HttpServlet {
21
22     /**
23      * Processes requests for both HTTP GET and POST
24      * methods.
25      *
26      * @param request servlet request
27      * @param response servlet response
28      * @throws ServletException if a servlet-specific error occurs
29      * @throws IOException if an I/O error occurs
30      */
31     protected void processRequest(HttpServletRequest request, HttpServletResponse response)
32         throws ServletException, IOException {
33         response.setContentType("text/html;charset=UTF-8");
```

```

36 PrintWriter out = response.getWriter();
37 Connection conn = null;
38 PreparedStatement stmt = null;
39
40 try {
41     // Get form data
42     String username = request.getParameter("username");
43     String icno = request.getParameter("icno");
44     String firstname = request.getParameter("firstname");
45
46     // Load the JDBC driver
47     Class.forName("com.mysql.cj.jdbc.Driver");
48
49     // Establish a connection
50     conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/csm3023", "root", "admin");
51
52     // Prepare the SQL statement
53     String sql = "INSERT INTO userprofile (username, icno, firstname) VALUES (?, ?, ?)";
54     stmt = conn.prepareStatement(sql);
55     stmt.setString(1, username);
56     stmt.setString(2, icno);
57     stmt.setString(3, firstname);
58
59     // Execute the statement
60     int rows = stmt.executeUpdate();
61
62     if (rows > 0) {
63         out.println("<hl>Profile registered successfully!</hl>");
64     } else {
65         out.println("<hl>Profile registration failed.</hl>");
66     }
67
68 } catch (SQLException | ClassNotFoundException e) {
69     out.println("<hl>Error: " + e.getMessage() + "</hl>");
70     e.printStackTrace();
71 } finally {
72     try {
73         if (stmt != null) stmt.close();
74         if (conn != null) conn.close();
75     } catch (SQLException e) {
76         e.printStackTrace();
77     }
78
79     out.close();
80 }

```

```

90  @Override
91  protected void doGet(HttpServletRequest request, HttpServletResponse response)
92      throws ServletException, IOException {
93      response.setContentType("text/html");
94      PrintWriter out = response.getWriter();
95      out.println("<html>");
96      out.println("<head><title>Profile Registration</title></head>");
97      out.println("<body>");
98      out.println("<h2>Profile Registration Form</h2>");
99      out.println("<form action='profileServlet' method='post'>");
100     out.println("Username: <input type='text' name='username' maxlength='15' required><br><br>");
101     out.println("IC Number: <input type='text' name='icno' maxlength='15' required><br><br>");
102     out.println("First Name: <input type='text' name='firstname' maxlength='50' required><br><br>");
103     out.println("<input type='submit' value='Register'>");
104     out.println("</form>");
105     out.println("</body>");
106     out.println("</html>");
107 }
108
109 @Override
110 protected void doPost(HttpServletRequest request, HttpServletResponse response)
111     throws ServletException, IOException {
112     processRequest(request, response);
113 }
114
115 @Override
116 public String getServletInfo() {
117     return "Short description";
118 }
119
120 }

```

The output.

New Record

Username :	<input type="text" value="ssss02"/>
IC Number :	<input type="text" value="991490-10-5564"/>
First Name :	<input type="text" value="Sufian"/>
<input type="button" value="Register"/> <input type="button" value="Cancel"/>	

Profile registered successfully!

Result Grid			
Filter Rows: <input type="text"/>			
	username	icno	firstname
▶	arinn0205	031231-01-8956	Nur
	ssss02	991490-10-5564	Sufian

Q2) Applying session in student registration.

1. Create main interface for student registration; studentid, name. (studentRegister.jsp)
2. When student click Submit button, it will redirect to confirmation page (confirmRegister.jsp)
3. When user click Proceed button, current page will forward notification to end user via Notification page (notificationRegister.jsp)

studentRegister.jsp

```
1 <!--
2 Document : studentRegister
3 Created on : Jun 1, 2024, 2:11:45 AM
4 Author : User
5 -->
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <%@ page session="true" %>
9 <!DOCTYPE html>
10 <html>
11 <head>
12 <meta charset="UTF-8">
13 <title>Student Registration</title>
14 </head>
15 <body>
16 <h1>Student Registration</h1>
17 <form action="confirmRegister.jsp" method="post">
18 <label for="studentid">Student ID:</label>
19 <input type="text" id="studentid" name="studentid" required><br><br>
20 <label for="name">Name:</label>
21 <input type="text" id="name" name="name" required><br><br>
22 <input type="submit" value="Submit">
23 </form>
24 </body>
25 </html>
```

confirmRegister.jsp

```
1 <!--
2 Document : confirmRegister
3 Created on : Jun 1, 2024, 2:13:02 AM
4 Author : User
5 -->
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <%@ page session="true" %>
9 <!DOCTYPE html>
10 <html>
11 <head>
12 <meta charset="UTF-8">
13 <title>Confirm Registration</title>
14 </head>
15 <body>
16 <h1>Confirm Registration</h1>
17 <%
18 String studentId = request.getParameter("studentid");
19 String name = request.getParameter("name");
20
21 // Store the student details in session
22 session.setAttribute("studentid", studentId);
23 session.setAttribute("name", name);
24 %>
25 <p>Student ID: <%= studentId %></p>
26 <p>Name: <%= name %></p>
27 <form action="notificationRegister.jsp" method="post">
28 <input type="submit" value="Proceed">
29 </form>
30 </body>
31 </html>
```

notificationRegister.jsp

```
1 <%--
2     Document    : notificationRegister
3     Created on  : Jun 1, 2024, 2:14:22 AM
4     Author     : User
5 --%>
6
7 <%@page contentType="text/html" pageEncoding="UTF-8"%>
8 <%@ page session="true" %>
9 <!DOCTYPE html>
10 <html>
11 <head>
12     <meta charset="UTF-8">
13     <title>Registration Notification</title>
14 </head>
15 <body>
16     <h1>Registration Notification</h1>
17     <%
18         String studentId = (String) session.getAttribute("studentid");
19         String name = (String) session.getAttribute("name");
20
21         if (studentId != null && name != null) {
22             %>
23             <p>Registration successful for Student ID: <%= studentId %> and Name: <%= name %></p>
24             <%
25                 session.invalidate(); // End the session
26             } else {
27                 %>
28                 <p>No registration information found.</p>
29             <%
30             }
31         %>
32     </body>
33 </html>
```

The output.

Student Registration

Student ID:

Name:

Confirm Registration

Student ID: s67604

Name: Harinatul

Registration Notification

Registration successful for Student ID: s67604 and Name: Harinatul