UNIVERSITI MALAYSIA TERENGGANU

Faculty Of Computer Sciences and Mathematics

Web Based Application Development

CSM3023

Lab Report 7

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Bachelor of Computer Science (Mobile Computing) with Honors.

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Task 1: Perform Basic CRUD Process Using Java Servlet

Coding:

User.java

```
package com.model;

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.*;

public class DBConnection {
    private static Connection myConnection = null;
    private static String myURL = "jdbc:mysql://localhost:3306/csm3023_lab7";

    DBConnection(){
    }

    public static Connection getConnection() throws ClassNotFoundException
```

```
   {
      if (myConnection != null)
      {
         return myConnection;
      }
      else
      try
      {
         Class.forName("com.mysql.cj.jdbc.Driver");
         myConnection = DriverManager.getConnection(myURL, "root", "admin");
      }
      catch (SQLException e)
      {
         e.printStackTrace();
      }
      return myConnection;
   }

   public void closeConnection() throws ClassNotFoundException
   {
      try
      {
         myConnection.close();
      }
      catch(SQLException e)
      {
         e.printStackTrace();
      }
   }
}
```

UserDao.java

```
package com.dao;

import java.sql.*;
import java.util.*;
import com.model.User;
import com.util.DBConnection;
public class UserDao {
   private Connection connection;

   public UserDao() throws ClassNotFoundException{
      connection = DBConnection.getConnection();
   }

   public void addUser(User user){
```

```java
    try{
      PreparedStatement preparedStatement = connection
          .prepareStatement("insert into users(userid, firstname, lastname) values (?, ?, ?)");

      //Parameters start with 1
      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=?");
      // Parameters start with 1
      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=?");
      // Parameters start with 1
      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<User>();
    try{
      Statement statement = connection.createStatement();
      ResultSet rs = statement.executeQuery("select * from users");
      while (rs.next()){
        User user = new User();
```

```java
                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();

            while (rs.next()){
                user.setUserid(rs.getString("userid"));
                user.setFirstName(rs.getString("firstname"));
                user.setLastName(rs.getString("lastname"));
            }
        }catch(SQLException e){
            e.printStackTrace();
        }
        return user;
    }
}
```

UserController.java

```java
package com.controller;

import java.io.IOException;
import java.io.PrintWriter;
import java.text.ParseException;

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 com.dao.UserDao;
import com.model.User;
```

```java
import jakarta.servlet.RequestDispatcher;
/**
 *
 * @author muhdi
 */
@WebServlet(name = "UserController", urlPatterns = {"/UserController"})
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;

    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 if (action.equalsIgnoreCase("insert")){
            forward =INSERT;
        }
        RequestDispatcher view = request.getRequestDispatcher(forward);
        view.forward(request, response);
    }

    @Override
```

```java
    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(action.equalsIgnoreCase("edit"))
    {
        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 "Short description";
  }
}
```

Index.jsp

```jsp
<%@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>
```

listUser.jsp

```jsp
<%@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>User Lists</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>
```

user.jsp

```jsp
<%@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>
```

```html
    <br/>
    <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" value="" size="25" required /></td>
          </tr>
          <tr>
            <td>First Name :</td>
            <td><input type="text" name="firstname" value="" size="40" /></td>
          </tr>
          <tr>
            <td>Last Name :</td>
            <td><input type="text" name="lastname" value="" size="40" /></td>
          </tr>
          <tr>
            <td><input type="hidden" name="action" value="insert"
          <tr>
            <td><input type="hidden" name="action" value="insert" /></td>
          </tr>
          <tr>
            <td>
              <input type="submit" value="Submit" name="submit" />
              <input type="reset" value="Cancel" name="cancel" />
            </td>
          </tr>
        </tbody>
      </table>
    </form>
</body>
</html>
```

editUser.jsp

```jsp
<%@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>
```

```html
      <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" value="Submit" name="submit" />
              </td>
            </tr>
          </tbody>
        </table>
      </form>
</body>
</html>
```

Output:

New Record

User ID :	S67610
First Name :	Abdullah
Last Name :	Atan

Submit   Cancel

User Lists

User Id	First Name	Last Name	Action	
S64536	Kamal	Jariah	Update	Delete
S66803	Muhd	Imran	Update	Delete
S66977	Ahmad	Tarmizi	Update	Delete
S67610	Abdullah	Atan	Update	Delete

Add User

Reflection:

1. Why we use servlet for Java Web Application?

Servlets are used in Java web applications to efficiently handle web requests and generate dynamic content, providing robust security, scalability, and seamless integration with other Java EE technologies.

Exercise

Coding:

profileServlet.java

```java
package com.controller;

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;

public class profileServlet extends HttpServlet {

    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");

        PrintWriter out = response.getWriter();
        Connection conn = null;
        PreparedStatement stmt = null;

        try {
            // Get form data
            String username = request.getParameter("username");
            String icno = request.getParameter("icno");
            String firstname = request.getParameter("firstname");

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

            // Establish a connection
            conn = DriverManager.getConnection("jdbc:mysql://localhost:3306/csm3023_lab7", "root",
"admin");

            // Prepare the SQL statement
            String sql = "INSERT INTO userprofile (username, icno, firstname) VALUES (?, ?, ?)";
```

```java
            stmt = conn.prepareStatement(sql);
            stmt.setString(1, username);
            stmt.setString(2, icno);
            stmt.setString(3, firstname);

            // Execute the statement
            int rows = stmt.executeUpdate();

            if (rows > 0) {
                out.println("<h1>Profile registered successfully!</h1>");
            } else {
                out.println("<h1>Profile registration failed.</h1>");
            }
        } catch (SQLException | ClassNotFoundException e) {
            out.println("<h1>Error: " + e.getMessage() + "</h1>");
            e.printStackTrace();
        } finally {
            try {
                if (stmt != null) stmt.close();
                if (conn != null) conn.close();
            } catch (SQLException e) {
                e.printStackTrace();
            }
        }

        out.close();
    }

    // <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the + sign on the left to
edit the code.">
    /**
     * Handles the HTTP <code>GET</code> method.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
        response.setContentType("text/html");
        PrintWriter out = response.getWriter();
        out.println("<html>");
        out.println("<head><title>Profile Registration</title></head>");
        out.println("<body>");
        out.println("<h2>Profile Registration Form</h2>");
        out.println("<form action='profileServlet' method='post'>");
```

```java
    out.println("Username: <input type='text' name='username' maxlength='50' required><br><br>");
    out.println("IC Number: <input type='text' name='icno' maxlength='50' required><br><br>");
    out.println("First Name: <input type='text' name='firstname' maxlength='50' required><br><br>");
    out.println("<input type='submit' value='Register'>");
    out.println("</form>");
    out.println("</body>");
    out.println("</html>");
  }

  /**
   * Handles the HTTP <code>POST</code> method.
   *
   * @param request servlet request
   * @param response servlet response
   * @throws ServletException if a servlet-specific error occurs
   * @throws IOException if an I/O error occurs
   */
  @Override
  protected void doPost(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {
    processRequest(request, response);
  }

  /**
   * Returns a short description of the servlet.
   *
   * @return a String containing servlet description
   */
  @Override
  public String getServletInfo() {
    return "Short description";
  }// </editor-fold>

}
```

profile.jsp

```jsp
<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
  <head>
    <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
    <title>Profile Register</title>
  </head>
  <body>
    <br/>
    <p><b>New Record</b></p>
```

```html
    <form name="formAddProfile" action="profileServlet" method="POST">
      <table border="0">
        <tbody>
          <tr>
            <td>Username :</td>
            <td><input type="text" id="username" name="username" maxlength="50" required
/></td>
          </tr>
          <tr>
            <td>IC Number :</td>
            <td><input type="text" id="icno" name="icno" maxlength="50" /></td>
          </tr>
          <tr>
            <td>First Name :</td>
            <td><input type="text" id="firtname" name="firstname" maxlength="50" /></td>
          </tr>
          <tr>
            <td>
              <input type="submit" value="Register" name="submit" />
              <input type="reset" value="Cancel" name="cancel" />
            </td>
          </tr>
        </tbody>
      </table>
    </form>
  </body>
</html>
```

studentRegister.jsp

```jsp
<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<%@ page session="true" %>
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Student Registration</title>
</head>
<body>
  <h1>Student Registration</h1>
  <form action="confirmRegister.jsp" method="post">
    <label for="studentid">Student ID:</label>
    <input type="text" id="studentid" name="studentid" required><br><br>
    <label for="name">Name:</label>
    <input type="text" id="name" name="name" required><br><br>
    <input type="submit" value="Submit">
  </form>
```

```
</body>
</html>
```

confirmRegister.jsp

```
<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<%@ page session="true" %>
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Confirm Registration</title>
</head>
<body>
  <h1>Confirm Registration</h1>
  <%
    String studentId = request.getParameter("studentid");
    String name = request.getParameter("name");

    // Store the student details in session
    session.setAttribute("studentid", studentId);
    session.setAttribute("name", name);
  %>
  <p>Student ID: <%= studentId %></p>
  <p>Name: <%= name %></p>
  <form action="notificationRegister.jsp" method="post">
    <input type="submit" value="Proceed">
  </form>
</body>
</html>
```

notification.jsp

```
<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<%@ page session="true" %>
<!DOCTYPE html>
<html>
<head>
  <meta charset="UTF-8">
  <title>Registration Notification</title>
</head>
<body>
  <h1>Registration Notification</h1>
  <%
    String studentId = (String) session.getAttribute("studentid");
```

```
        String name = (String) session.getAttribute("name");

        if (studentId != null && name != null) {
    %>
        <p>Registration successful for Student ID: <%= studentId %> and Name: <%= name %></p>
    <%
        session.invalidate(); // End the session
        } else {
    %>
        <p>No registration information found.</p>
    <%
        }
    %>
</body>
</html>
```

Output:

New Record

Username :	S67978
IC Number :	010203-02-0321
First Name :	Muhd Haziq

Register   Cancel

Profile registered successfully!

	username	icno	firstname
▶	S67978	010203-02-0321	Muhd Haziq
*	NULL	NULL	NULL