UNIVERSITI MALAYSIA TERENGGANU

Faculty Of Computer Sciences and Mathematics

Web Based Application Development
CSM3023

Lab Report 2

Prepared for:

Sir Mohd Arizal Shamsil bin Mat Rifin

Prepared by:

Muhammad Imran Bin Abd Hamid (S66803)

Bachelor of Computer Science (Mobile Computing) with Honors.

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Task 1: Data Sharing in Servlet

Code:

```html
<!DOCTYPE html>
<!--
Login page
-->
<html>
  <head>
    <title>Login Page</title>
    <meta charset="UTF-8">
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <style>
      body {
        background-color: black;
        text-align: left;
        color: white;
        font-family: Arial, Helvetica, sans-serif;
      }
    </style>
  </head>
  <body>

    <h1>Welcome to CSM3023</h1>
    <p>Please insert your username and password</p>
    <form name="login" id="login" action="LoginServlet" method="POST"
autocomplete="off">
      Username : <input type="text" name="txtUsername"><br>
      Password : <input type="text" name="txtPassword"><br>
      <br>
      <input type="submit" value="Login" name="btnLogin">
      <input type="reset" value="Reset" name="txtReset"><br>
    </form>
    <p><br>
    </p>

  </body>
</html>
```

```java
import java.io.IOException;
import java.util.HashMap;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
```

```java
import jakarta.servlet.RequestDispatcher;
import jakarta.servlet.ServletContext;

/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class LoginServlet extends HttpServlet {

    HashMap<String, String> users = new HashMap();

    @Override
    public void init() throws ServletException {
        super.init();
        users.put("Ali", "1234");
        users.put("Ahmad", "4567");
        users.put("Muthu", "8910");
    }

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

        String username = request.getParameter("txtUsername");
        String password = request.getParameter("txtPassword");

        if (!username.equals("") && !password.equals("")
                && users.get(username).equals(password)) {
            request.setAttribute("userid", username);
            ServletContext sc = getServletContext();
            RequestDispatcher rd = sc.getRequestDispatcher("/AccountServlet");
            rd.forward(request, response);
        }
        else {
            // avoid direct access to the servlet
            RequestDispatcher rd = request.getRequestDispatcher("/login.html");
            rd.forward(request, response);
        }
    }

    // <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.
     *
```

```java
     * @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 {
      processRequest(request, response);
    }

    /**
     * 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>

  }
```

```java
import java.io.IOException;
import java.io.PrintWriter;
import java.util.HashMap;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

/**
```

```java
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class AccountServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    HashMap<String, String[]> account = new HashMap();

    @Override
    public void init() throws ServletException {
        super.init();
        account.put("Ali", new String[]{"31/01/2019: 2000.00", "28/02/2019: 3000.00"});
        account.put("Ahmad", new String[]{"31/01/2019: 100.00", "28/02/2019: 5000.00"});
        account.put("Muthu", new String[]{"31/01/2019: 1000.00", "28/02/2019: 2000.00"});
    }

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

        String userid_login = (String) request.getAttribute("userid");

        try (PrintWriter out = response.getWriter()) {
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Servlet AccountServlet</title>");
            out.println("</head>");
            out.println("<body>");

            if (account.get(userid_login) == null)
                out.println("<h1>Sorry, no information found!</h1>");

            else {
                out.println("<h1>Account status for: " + userid_login + "</h1>");
                for (String tempAcc : account.get(userid_login)) {
                    out.println("<h2>" + tempAcc + "</h2>");
                }
```

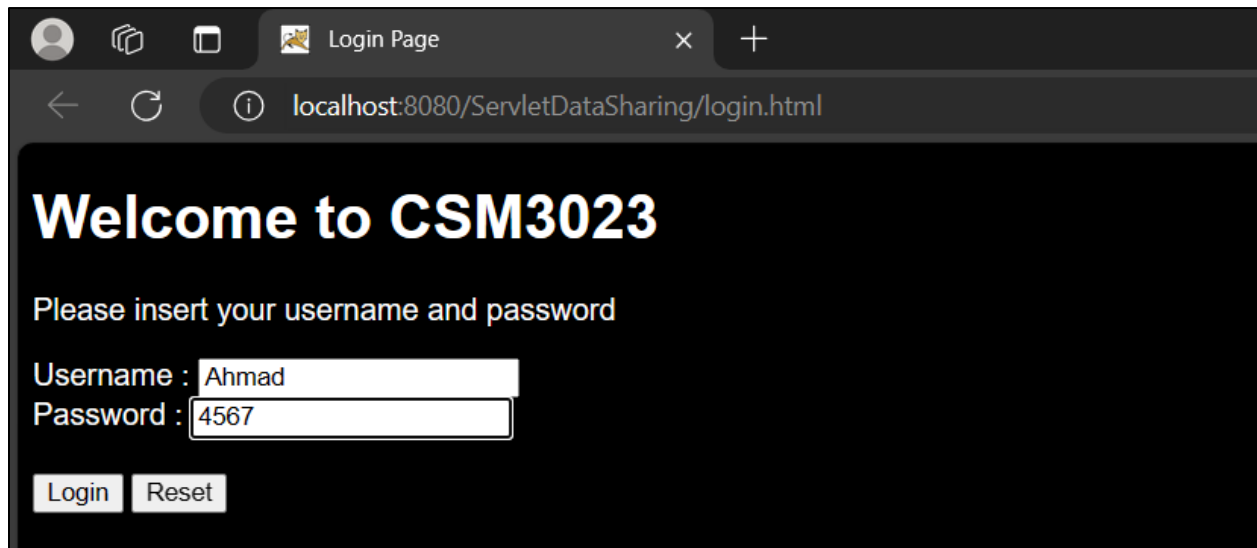```java
        }

        out.println("</body>");
        out.println("</html>");
    }
}
    // <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 {
        processRequest(request, response);
    }
    /**
     * 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>
}
```

Output:





Reflection:

1.What have you learnt from this exercise?

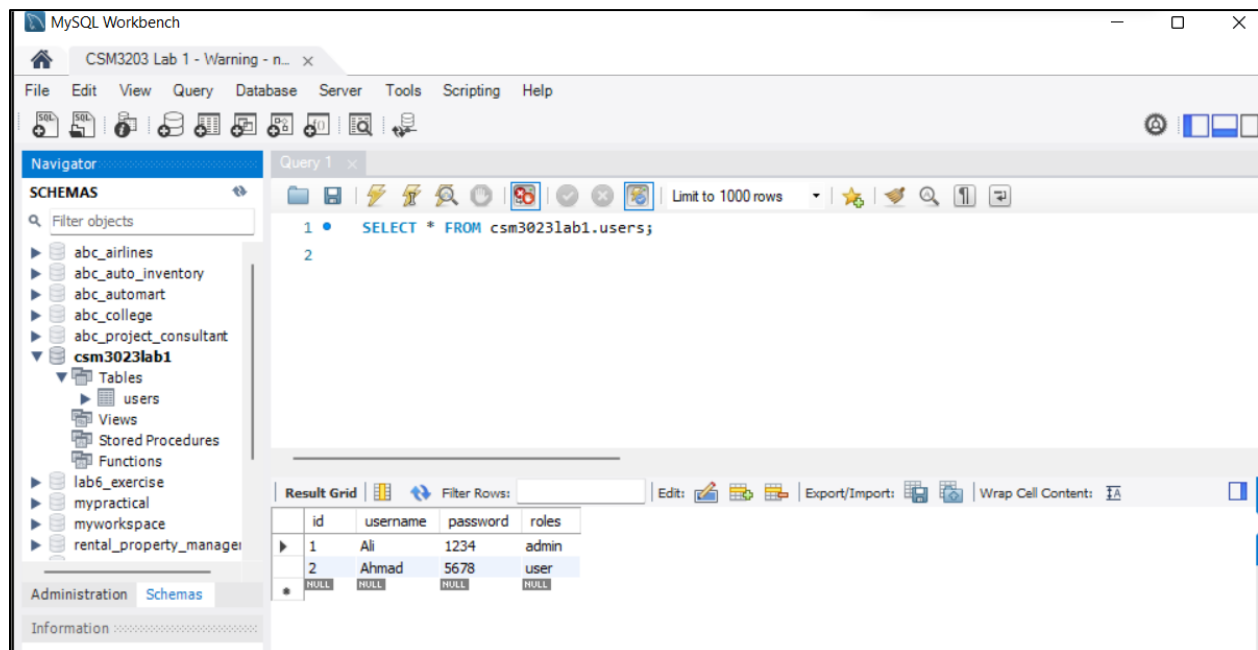How to use servlet for request forwarding and data sharing to authenticate user.

2. What are the common methods used in Java Servlet?

-doGet()

-doPost()

Task 2: Creating A Table in MySQL Database

Output:

Task 3: Setting the Environment of Web Application for Database Connection

Output:

Task 4: Using Servlets for Database CRUD Operations

Code:

```html
<!DOCTYPE html>
<html>
   <head>
      <title>User Management</title>
      <meta charset="UTF-8">
      <meta name="viewport" content="width-device-width, initial-scale=1.0">
   </head>
   <body>
      <h1>Add New User</h1>
      <form action="JavaServlet" method="post">
         <table>
            <tr><td>Username</td><td><input type="text" name="name"/></td></tr>
            <tr><td>Password</td><td><input type="password" name="password"/></td></tr>
            <tr><td>Role:</td><td>
                  <select name="role" style="width:150px">
                     <option>admin</option>
                     <option>user</option>
                  </select>
               </td></tr>
            <tr><td colspan="2"><input type="submit" value="Save User"></td></tr>
         </table>
      </form>

      <br/>
      <a href="ViewServlet">View users</a>
   </body>
</html>
```
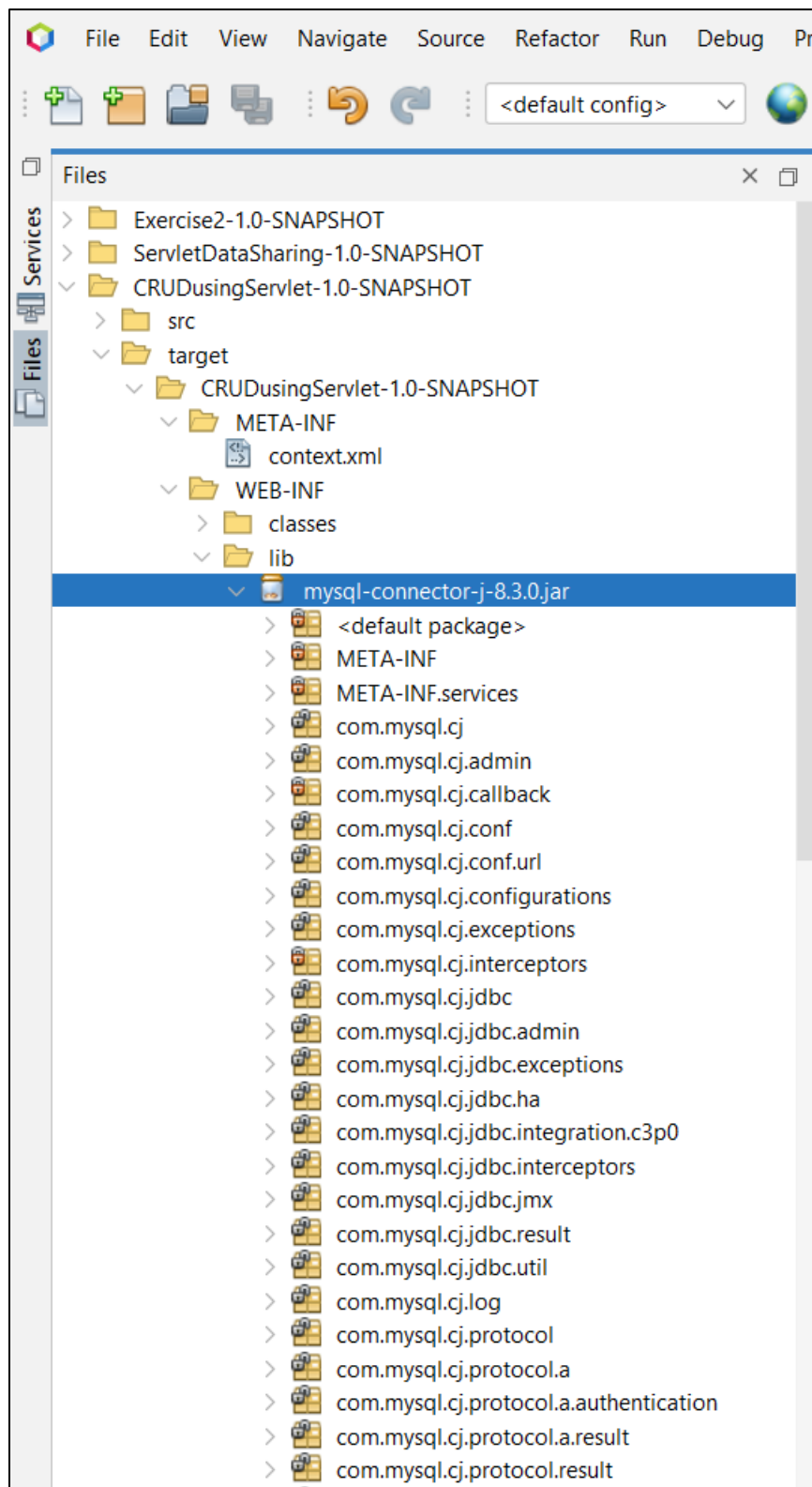<div align="center">index.html</div>

```java
/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class User {

   private int id;
   private String username, password, role;

   public int getId() {
      return id;
   }
```

```java
    public void setId(int id) {
        this.id = id;
    }

    public String getUsername() {
        return username;
    }

    public void setUsername(String username) {
        this.username = username;
    }

    public String getPassword() {
        return password;
    }

    public void setPassword(String password) {
        this.password = password;
    }

    public String getRole() {
        return role;
    }

    public void setRole(String role) {
        this.role = role;
    }

}
```

User.java

```java
/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
import java.util.*;
import java.sql.*;

public class UserDao {

    public static Connection getConnection() {
        Connection con = null;
        try {
            Class.forName("com.mysql.jdbc.Driver");
```

```java
            con = DriverManager.getConnection("jdbc:mysql://localhost:3306/csm3203lab1",
"root", "admin");
        }
        catch (Exception e) {
            System.out.println(e);
        }
        return con;
    }

    public static int save(User e) {
        int status = 0;
        try {
            Connection con = UserDao.getConnection();
            PreparedStatement ps = con.prepareStatement(
                    "INSERT INTO users(username, password, roles) VALUES (?, ?, ?)"
            );
            ps.setString(1, e.getUsername());
            ps.setString(2, e.getPassword());
            ps.setString(3, e.getRole());

            status = ps.executeUpdate();

            con.close();
        } catch (Exception ex) {
            ex.printStackTrace();
        }

        return status;
    }

    public static int update(User e) {
        int status = 0;
        try {
            Connection con = UserDao.getConnection();
            PreparedStatement ps = con.prepareStatement(
                    "UPDATE users SET username = ?, password = ?, roles = ? WHERE id = ?"
            );
            ps.setString(1, e.getUsername());
            ps.setString(2, e.getPassword());
            ps.setString(3, e.getRole());
            ps.setInt(4, e.getId());

            status = ps.executeUpdate();

            con.close();
        } catch (Exception ex) {
```

```java
            ex.printStackTrace();
        }

        return status;
    }

    public static int delete(int id) {
        int status = 0;

        try {
            Connection con = UserDao.getConnection();
            PreparedStatement ps = con.prepareStatement(
                    "DELETE FROM users WHERE id = ?"
            );
            ps.setInt(1, id);

            status = ps.executeUpdate();

            con.close();
        } catch (Exception ex) {
            ex.printStackTrace();
        }

        return status;
    }

    public static User getUserById(int id) {
        User e = new User();

        try {
            Connection con = UserDao.getConnection();
            PreparedStatement ps = con.prepareStatement(
                    "SELECT * FROM users WHERE id = ?"
            );
            ps.setInt(1, id);
            ResultSet rs = ps.executeQuery();
            if (rs.next()) {
                e.setId(rs.getInt(1));
                e.setUsername(rs.getString(2));
                e.setPassword(rs.getString(3));
                e.setRole(rs.getString(4));
            }

            con.close();
        } catch (Exception ex) {
            ex.printStackTrace();
```

```java
    }

    return e;
  }

  public static List<User> getAllUsers() {
    List<User> list = new ArrayList<User>();

    try {
      Connection con = UserDao.getConnection();
      PreparedStatement ps = con.prepareStatement(
          "SELECT * FROM users"
      );
      ResultSet rs = ps.executeQuery();
      while (rs.next()) {
        User e = new User();
        e.setId(rs.getInt(1));
        e.setUsername(rs.getString(2));
        e.setPassword(rs.getString(3));
        e.setRole(rs.getString(4));
        list.add(e);
      }
      con.close();
    } catch (Exception ex) {
      ex.printStackTrace();
    }

    return list;
  }
}
```

UserDao.java

```java
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class SaveServlet extends HttpServlet {
```

```java
    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        String name = request.getParameter("name");
        String password = request.getParameter("password");
        String role = request.getParameter("role");

        User e = new User();
        e.setUsername(name);
        e.setPassword(password);
        e.setRole(role);

        int status = UserDao.save(e);
        if (status > 0) {
            out.print("<p>Record saved successfully!</p>");
            request.getRequestDispatcher("index.html").include(request, response);
        }
        else {
            out.println("Sorry! Unable to save record.");
        }

        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
```

```java
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
      processRequest(request, response);
    }

    /**
     * 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>

}
```

SaveServlet

```java
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
import java.util.List;

/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class ViewServlet extends HttpServlet {
```

```java
    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();
        out.println("<a href='index.html'>Add New User</a>");
        out.println("<h1>User List</h1>");

        List<User> list = UserDao.getAllUsers();

        out.print("<table border='1' width='100%'>");

out.print("<tr><th>Id</th><th>Name</th><th>Password</th><th>Role</th><th>Edit</th><th>Delete</th>");
        for (User e : list) {
            out.print("<tr><td>" + e.getId() + "</td><td>" + e.getUsername() + "</td><td>"
                    + e.getPassword() + "</td><td>" + e.getRole() + "</td><td><a
href='EditServlet?id="
                    + e.getId() + "'>Edit</a></td><td><a href='DeleteServlet?id="
                    + e.getId() + "'>Delete</a></td></tr>"
            );
        }
        out.print("</table>");

        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
     */
```

```java
    @Override
    protected void doGet(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
      processRequest(request, response);
    }

    /**
     * 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>

}
```

ViewServlet

```java
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class EditServlet extends HttpServlet {
```

```java
/**
 * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
 * methods.
 *
 * @param request servlet request
 * @param response servlet response
 * @throws ServletException if a servlet-specific error occurs
 * @throws IOException if an I/O error occurs
 */
protected void processRequest(HttpServletRequest request, HttpServletResponse response)
        throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    PrintWriter out = response.getWriter();
    out.println("<h1>Update User</h1>");
    String sid = request.getParameter("id");
    int id = Integer.parseInt(sid);

    User e = UserDao.getUserById(id);

    out.print("<form action='EditServlet2' method='post'>");
    out.print("<table>");
    out.print("<tr><td></td><td><input type='hidden' name='id' value='"
            + e.getId() + "'></td></tr>");
    out.print("<tr><td>Name:</td><td><input type='text' name='username' value='"
            + e.getUsername() + "'></td></tr>");
    out.print("<tr><td>Password:</td><td><input type='password' name='password' value='"
            + e.getPassword() + "'></td></tr>");
    out.print("<tr><td>Role:</td><td>");
    out.print("<select name='role' style='width:150px'>");
    out.print("<option>Admin</option>");
    out.print("<option>User</option>");
    out.print("</select>");
    out.print("</td></tr>");
    out.print("<tr><td colspan='2'><input type='submit' value='Edit & Save'></td></tr>");
    out.print("</table></form>");

    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
```

```java
 * @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 {
    processRequest(request, response);
}

/**
 * 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>

}
```

EditServlet

```java
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
/**
 *
```

```java
 * @author Muhammad Imran Bin Abd Hamid
 */
public class EditServlet2 extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        PrintWriter out = response.getWriter();

        int id = Integer.parseInt(request.getParameter("id"));
        String username = request.getParameter("username");
        String password = request.getParameter("password");
        String role = request.getParameter("role");

        User e = new User();
        e.setId(id);
        e.setUsername(username);
        e.setPassword(password);
        e.setRole(role);

        int status = UserDao.update(e);
        if (status > 0) {
            out.print("<p>Record saved successfully!</p>");
            request.getRequestDispatcher("index.html").include(request, response);
        }
        else {
            out.println("Sorry! Unable to save record");
        }

        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 {
      processRequest(request, response);
    }

    /**
     * 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>

}
```

EditServlet2

```
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;
```

```java
/**
 *
 * @author Muhammad Imran Bin Abd Hamid
 */
public class DeleteServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        String sid = request.getParameter("id");
        int id = Integer.parseInt(sid);
        UserDao.delete(id);
        response.sendRedirect("ViewServlet");
    }

    // <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 {
        processRequest(request, response);
    }

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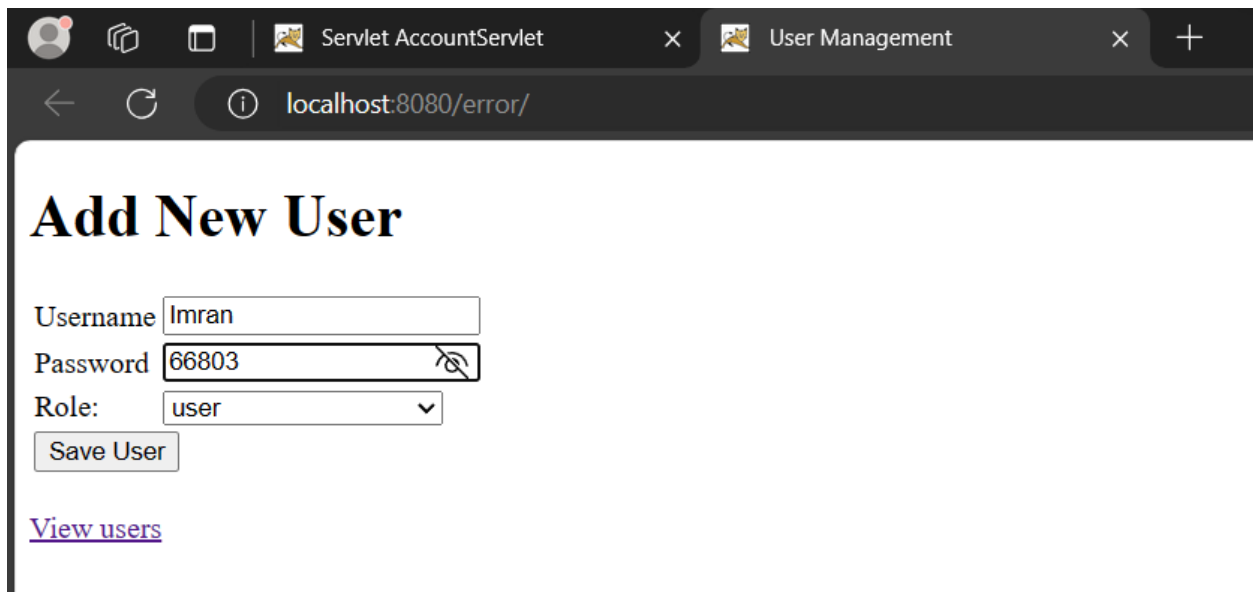
```java
 * @throws IOException if an I/O error occurs
 */
@Override
protected void doPost(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {
    processRequest(request, response);
}

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

}
```
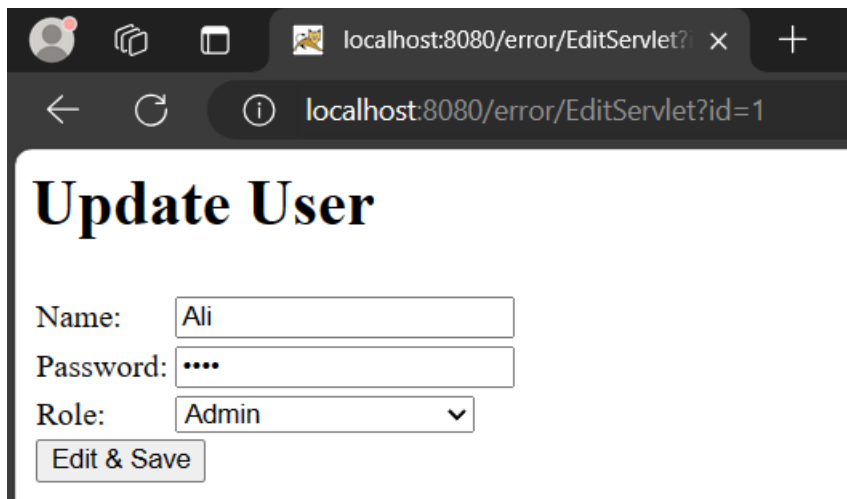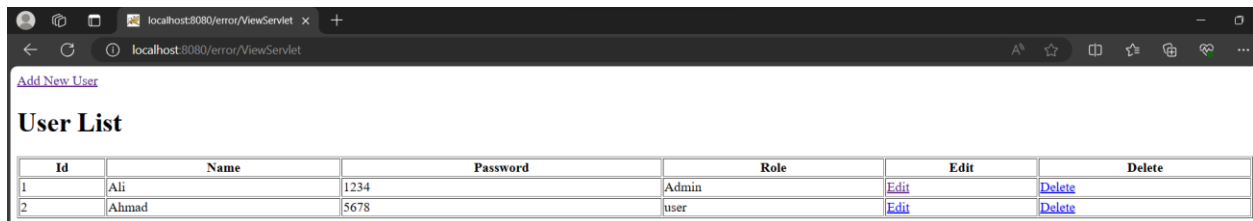
<p align="center">DeleteServlet</p>

Output:

Reflection:

1. What is the name of the Java Library that you need to import before coding the web application with database operations?

Java Database Connectivity (JDBC). It provides class and interfaces for access and manipulate relational database from java.

2. Which folder keeps the web.xml file? Copy the contents of the file and explain in brief the tags included such as . etc.

```xml
<?xml version="1.0" encoding="UTF-8"?>
<web-app version="6.0" xmlns="https://jakarta.ee/xml/ns/jakartaee"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="https://jakarta.ee/xml/ns/jakartaee
https://jakarta.ee/xml/ns/jakartaee/web-app_6_0.xsd">
  <servlet>
    <servlet-name>SaveServlet</servlet-name>
    <servlet-class>SaveServlet</servlet-class>
  </servlet>
  <servlet>
    <servlet-name>ViewServlet</servlet-name>
    <servlet-class>ViewServlet</servlet-class>
  </servlet>
  <servlet>
```

```xml
    <servlet-name>EditServlet</servlet-name>
    <servlet-class>EditServlet</servlet-class>
  </servlet>
  <servlet>
    <servlet-name>EditServlet2</servlet-name>
    <servlet-class>EditServlet2</servlet-class>
  </servlet>
  <servlet>
    <servlet-name>DeleteServlet</servlet-name>
    <servlet-class>DeleteServlet</servlet-class>
  </servlet>
  <servlet-mapping>
    <servlet-name>SaveServlet</servlet-name>
    <url-pattern>/SaveServlet</url-pattern>
  </servlet-mapping>
  <servlet-mapping>
    <servlet-name>ViewServlet</servlet-name>
    <url-pattern>/ViewServlet</url-pattern>
  </servlet-mapping>
  <servlet-mapping>
    <servlet-name>EditServlet</servlet-name>
    <url-pattern>/EditServlet</url-pattern>
  </servlet-mapping>
  <servlet-mapping>
    <servlet-name>EditServlet2</servlet-name>
    <url-pattern>/EditServlet2</url-pattern>
  </servlet-mapping>
  <servlet-mapping>
    <servlet-name>DeleteServlet</servlet-name>
    <url-pattern>/DeleteServlet</url-pattern>
  </servlet-mapping>
  <session-config>
    <session-timeout>
       30
    </session-timeout>
  </session-config>
</web-app>
```

Web.xml located at WEB-INF folder.

<servlet-name>: specify unique name for servlet.

<servlet-class>: specify qualified class name of servlet.

<servlet-mapping>: maps a servlet to URL pattern.

<url-pattern>: specify URL pattern to which servlet mapped

3.Define the usage of Data Access Object (DAO) servlet. How it eases the business process in your servlet-based web application?

DAO is a design pattern that provides an abstraction layer between application and the data source. It encapsulates the database access logic. DAOs use methods of CRUD (Create, Read, Update, Delete) operations on data entities.

By using DAO the servlet doesn't need to deal with complexity of database. The DAO provides clean and consistent interface for working with data, regardless of the underlying database technology.