



**UNIVERSITI MALAYSIA TERENGGANU**

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**CSM3023 – WEB BASED APPLICATION**

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

**LAB 2 – Servlet: Data Sharing and Database Management**

**SEMESTER II 2023/2024**

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(S66355)

## Task 1 : Data Sharing in Servlet

Code:

Login.html

```
package com.mycompany.servletdatasharing;

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.HashMap;

/**
 *
 * @author ARIF HAIKAL
 */
public class AccountServlet extends HttpServlet {

    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()) {
            /* TODO output your page here. You may use following sample code. */
            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>");
            }
        }

        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>  
  
}
```

## LoginServlet.java

```
package com.mycompany.servletdatasharing;

import jakarta.servlet.RequestDispatcher;
import jakarta.servlet.ServletContext;
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.HashMap;

/**
 *
 * @author ARIF HAIKAL
 */
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 {
            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.
 *
 * @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>
}

```

## AccountServlet.java

```
package com.mycompany.servletdatasharing;

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.HashMap;

/**
 *
 * @author ARIF HAIKAL
 */
public class AccountServlet extends HttpServlet {

    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()) {
            /* TODO output your page here. You may use following sample code. */
            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>");
        }
    }

    out.println("</body>");
    out.println("</html>");
}

// <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the + sign
on the left to edit the code.">
]
@Override
protected void doGet(HttpServletRequest request, HttpServletResponse response)
    throws ServletException, IOException {
    processRequest(request, response);
}

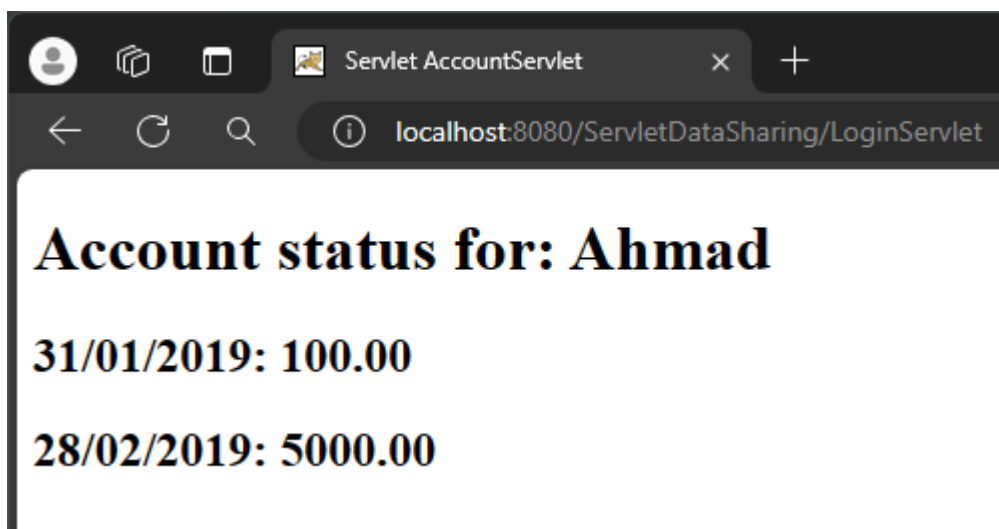
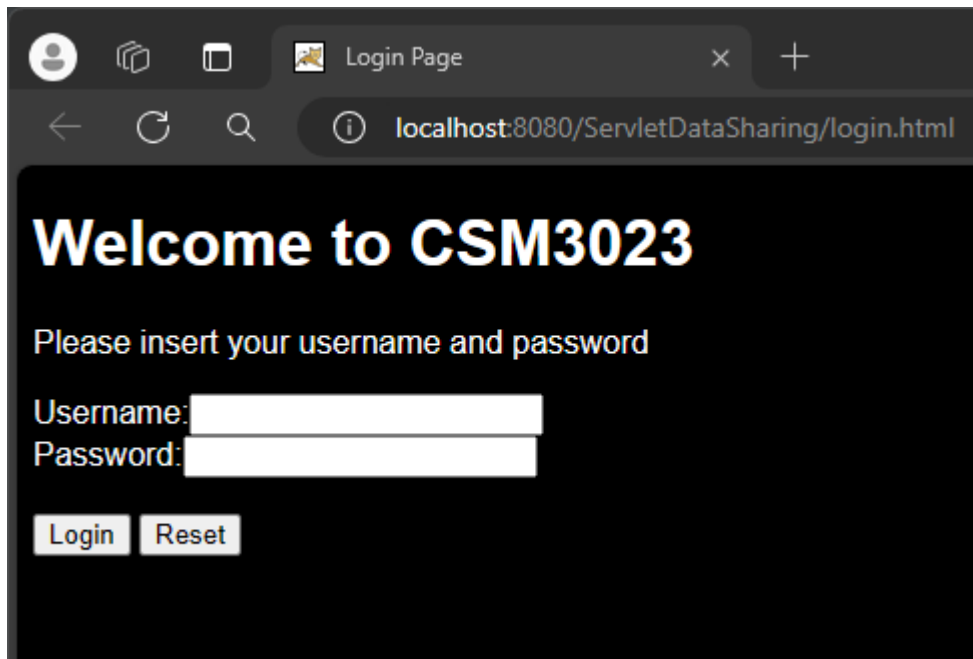
/**
 * Handles the HTTP <code>POST</code> method.
 *
 * @param request servlet request
 * @param response servlet response
 * @throws ServletException if a servlet-specific error occurs
 * @throws IOException if an I/O error occurs
 */
@Override
protected void doPost(HttpServletRequest request, HttpServletResponse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

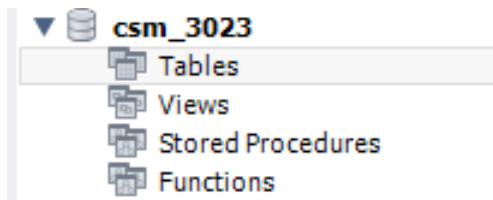
1) What have you learnt from this exercise?

- How to make data sharing in servlet using netbeans.

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

- Init(), doGet(), doPost()

## Task 2 : Creating A Table in MySQL Database



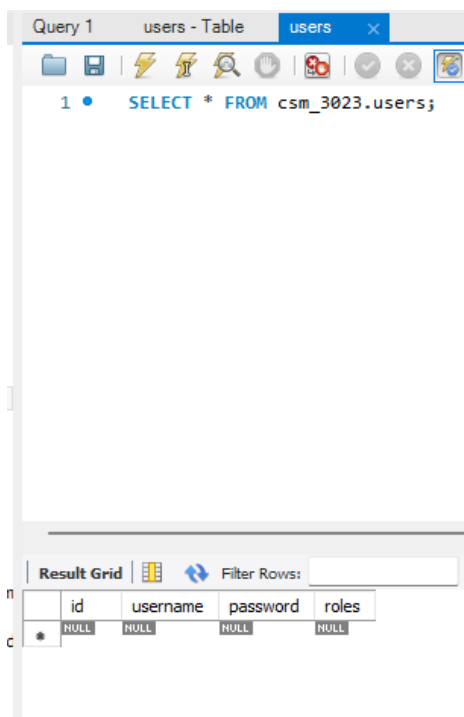
Query 1 users - Table

Table Name:  Schema: **csm\_3023**

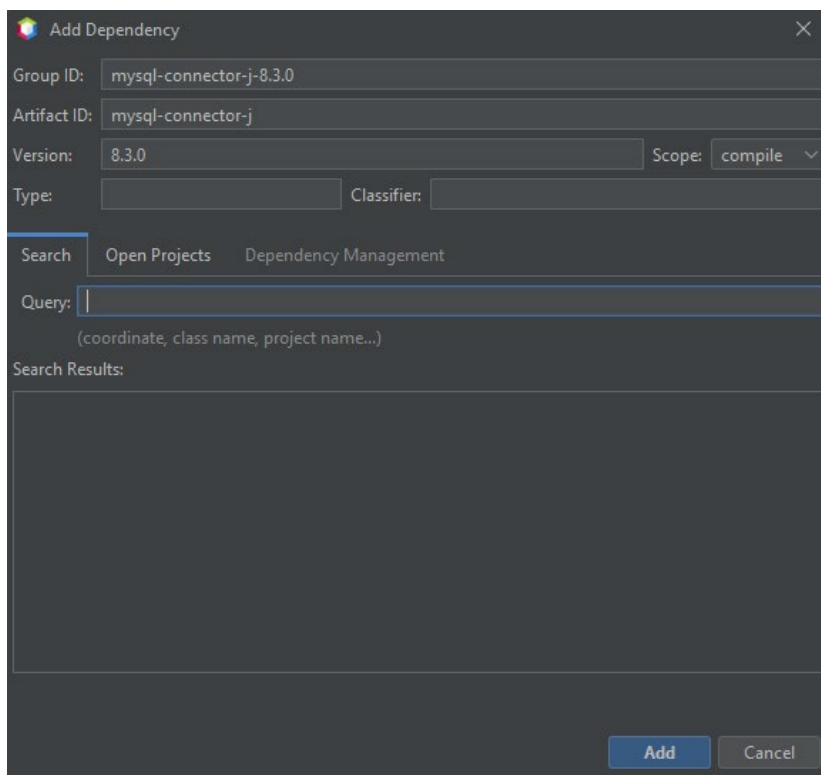
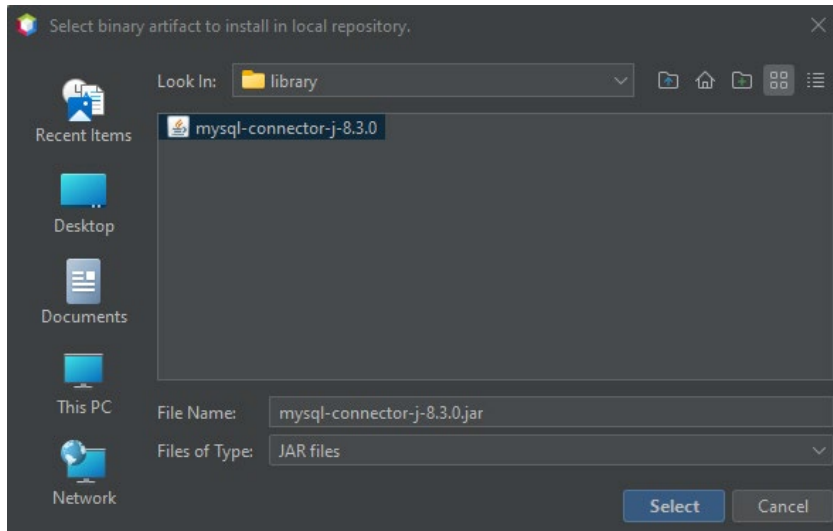
Charset/Collation:   Engine:

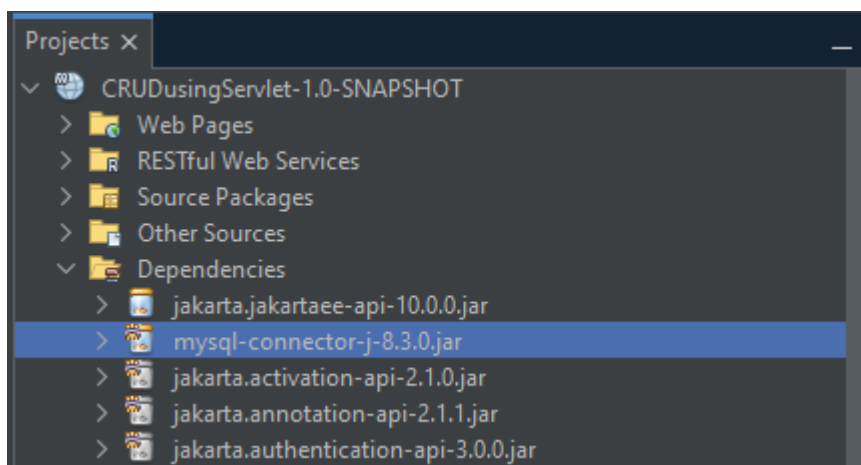
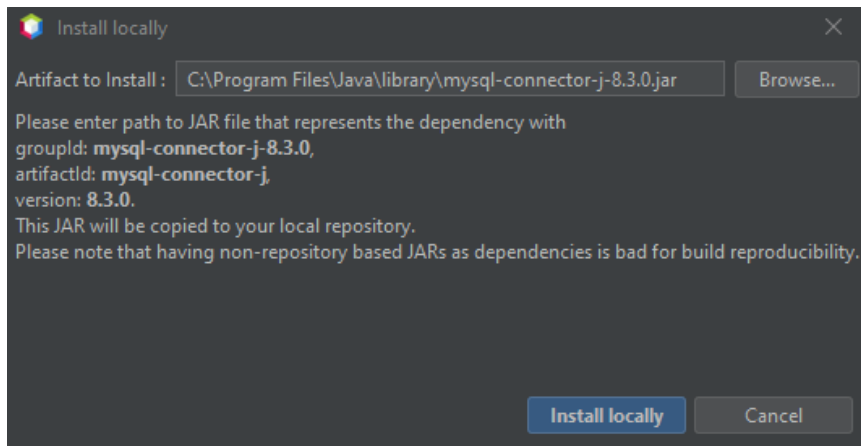
Comments:

Column Name	Datatype	PK	NN	UQ	B	UN	ZF	AI	G	Default/Expression
id	INT(11)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
username	VARCHAR(100)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
password	VARCHAR(225)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
roles	VARCHAR(10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	



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





## Task 4 : Using Servlets for Database CRUD Operations

Code :

Index.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="SaveServlet" 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>
```

User.java

```
package com.mycompany.crudusingservlet.resources;

/**
 *
 * @author ARIF HAIKAL
 */
public class User {

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

    public int getId() {
        return id;
    }

    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;
    }

}
```

## UserDao.java

```
package com.mycompany.crudusingservlet.resources;

/**
 *
 * @author ARIF HAIKAL
 */
import java.util.*;
import java.sql.*;

public class UserDao {

    public static Connection getConnection() {
        Connection con = null;
        try {
            Class.forName("com.mysql.jdbc.Driver");
            con = DriverManager.getConnection("jdbc:mysql://localhost:3306/lab2_task2",
"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) {
        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();
}

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;
}
}

```

## SaveServlet.java

```
package com.mycompany.crudusingservlet.resources;

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 ARIF HAIKAL
 */
public class SaveServlet extends HttpServlet {

    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();
    }
}
```

## ViewServlet.java

```
package com.mycompany.crudusingservlet.resources;

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 ARIF HAIKAL
 */
public class ViewServlet extends HttpServlet {

    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();
    }
}
```

## EditServlet.java

```
package com.mycompany.crudusingservlet.resources;

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 ARIF HAIKAL
 */
public class EditServlet extends HttpServlet {

    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();
    }
}
```

EditServlet2.java

```
package com.mycompany.crudusingservlet.resources;

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 ARIF HAIKAL
 */
public class SaveServlet extends HttpServlet {

    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();
    }
}
```

## DeleteServlet.java

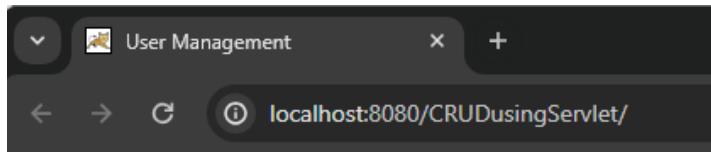
```
package com.mycompany.crudusingservlet.resources;

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 ARIF HAIKAL
 */
public class DeleteServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP GET and POST
     * 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");
    }
}
```

Output :



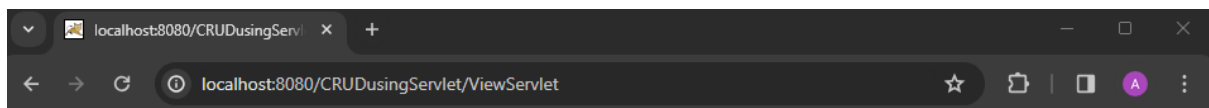
## Add New User

Username:

Password:

Role:

[view users](#)

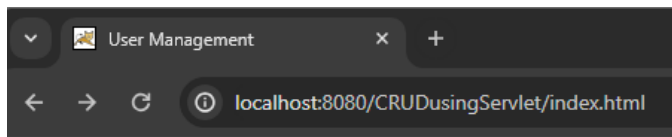


[Add New User](#)

## User List

Id	Name	Password	Role	Edit	Delete
----	------	----------	------	------	--------

- Add



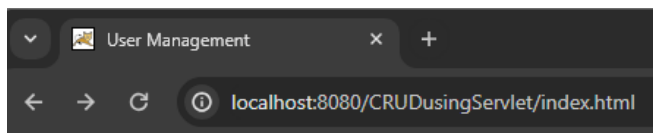
## Add New User

Username:

Password:

Role:

[view users](#)



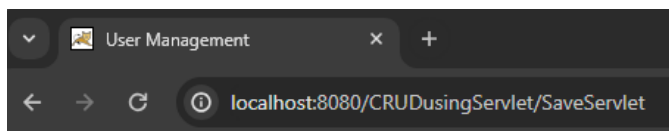
## Add New User

Username:

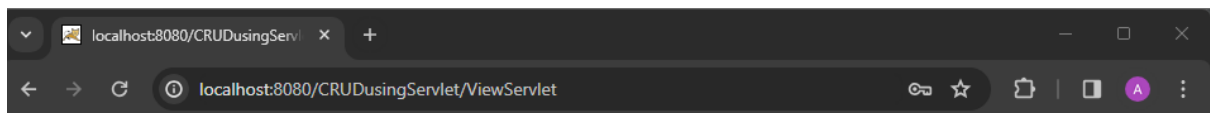
Password:

Role:

[view users](#)



Record saved successfully!



[Add New User](#)

## User List

Id	Name	Password	Role	Edit	Delete
1	Ali	1234	admin	<a href="#">Edit</a>	<a href="#">Delete</a>
2	Ahmad	4567	user	<a href="#">Edit</a>	<a href="#">Delete</a>



- **Edit**



The screenshot shows a web browser window with the address bar displaying 'localhost:8080/CRUDUsingServlet/EditServlet?id=1'. The page title is 'Update User'. The form contains three input fields: 'Name' with the value 'Ali', 'Password' with masked characters '....', and 'Role' with a dropdown menu showing 'Admin'. Below these fields is a button labeled 'Edit & Save'.

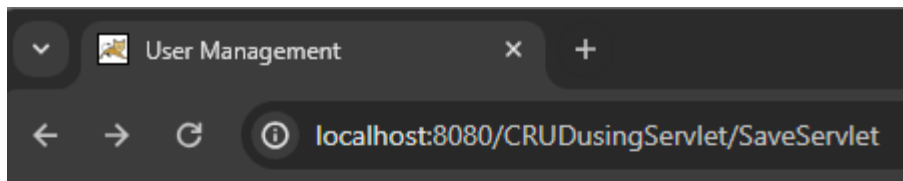
**Update User**

Name:

Password:

Role:

- Delete



Record saved successfully!

## Add New User

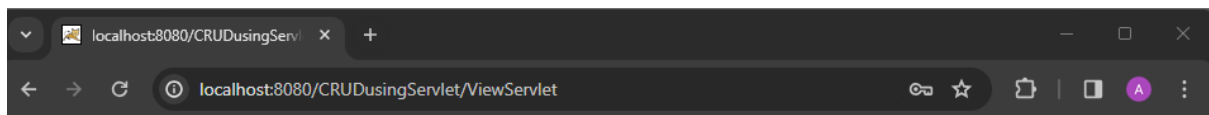
Username:

Password:

Role:

[view users](#)

Before

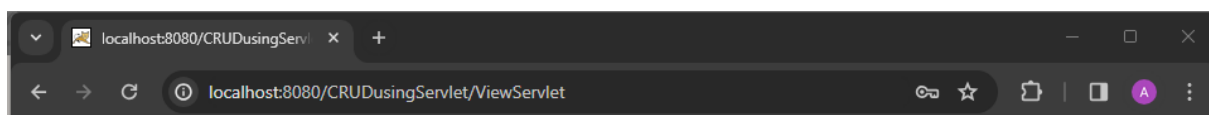


[Add New User](#)

## User List

Id	Name	Password	Role	Edit	Delete
1	Ali	1234	admin	<a href="#">Edit</a>	<a href="#">Delete</a>
2	Ahmad	4567	user	<a href="#">Edit</a>	<a href="#">Delete</a>
3	Muthu	1234	user	<a href="#">Edit</a>	<a href="#">Delete</a>

After



[Add New User](#)

## User List

Id	Name	Password	Role	Edit	Delete
1	Ali	1234	admin	<a href="#">Edit</a>	<a href="#">Delete</a>
2	Ahmad	4567	user	<a href="#">Edit</a>	<a href="#">Delete</a>

## Reflections:

1. What is the name of the Java Library that you need to import before coding the web application with database operations?
  - MySQL Connector
2. Which folder keeps the web.xml file? Copy the contents of the file and explain in brief the tags included such as <servlet-name><servlet-class><servlet-mapping>. etc.
  - <servlet>: This tag defines a servlet in the web application. It contains the <servlet-name> and <servlet-class> tags.
  - <servlet-name>: Specifies a name for the servlet. This name is used to reference the servlet in other parts of the web.xml file.
  - <servlet-name>: Specifies a name for the servlet. This name is used to reference the servlet in other parts of the web.xml file.
3. Define the usage of Data Access Object (DAO) servlet. How it ease the business process in your servlet-based web application?
  - A Data Access Object (DAO) servlet is a design pattern used to handle interactions with a database in a web application. It facilitates better management and reuse by keeping database-related code isolated from other application code. Additionally, it facilitates testing, enhances security, and makes switching between databases easy when necessary.