
**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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Link Github : https://github.com/Izzulwafiy03/LAB2WEB.git

**Task 1 : Data Sharing in Servlet**

Code:

LoginServlet.java

```
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;

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);
      }
```

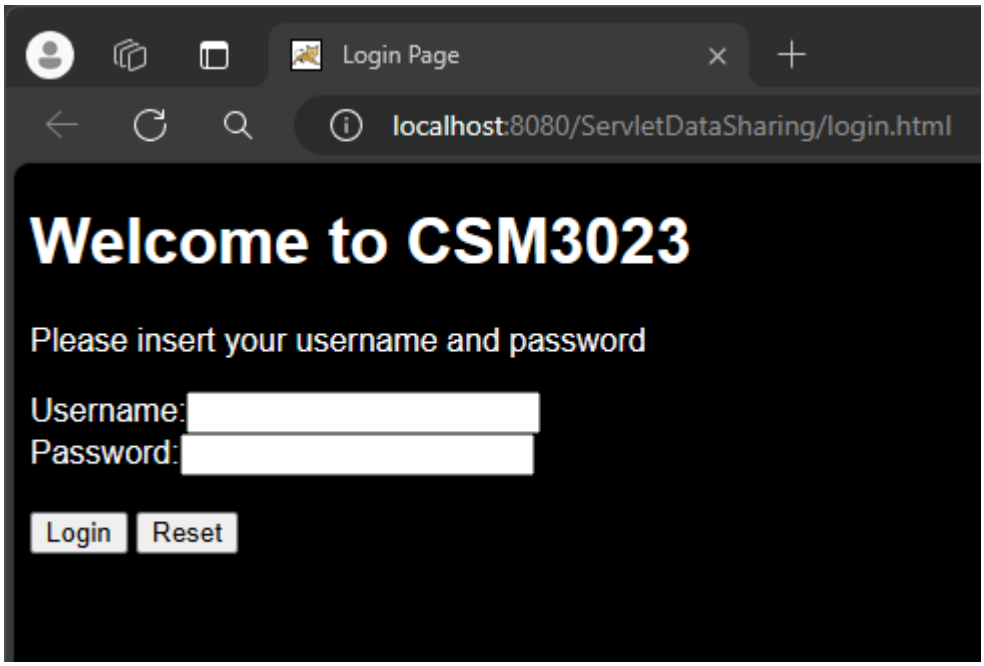
```
    }

    // <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>

}
```

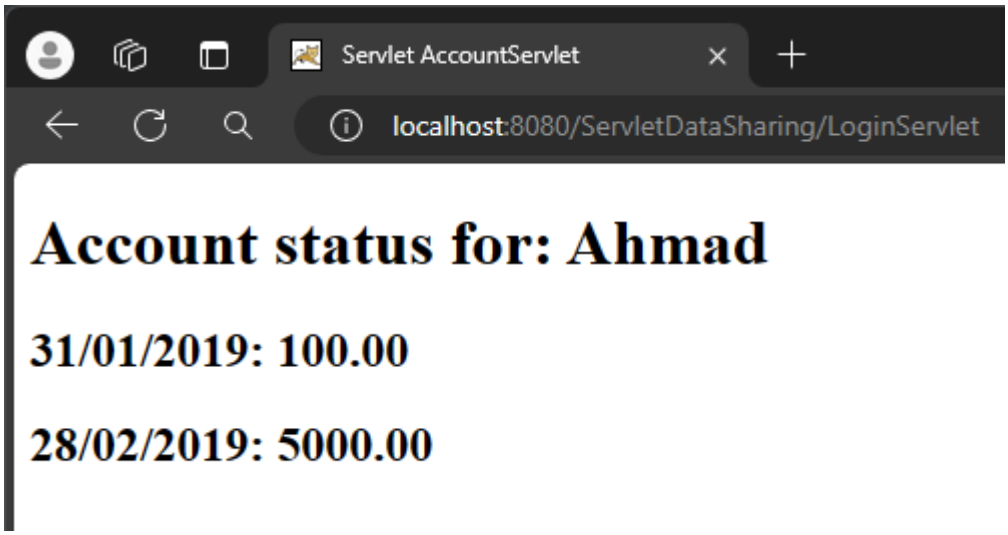
AccountServlet.java

```
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;

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**

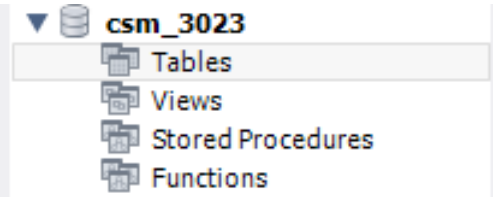
1) What have you learnt from this exercise?

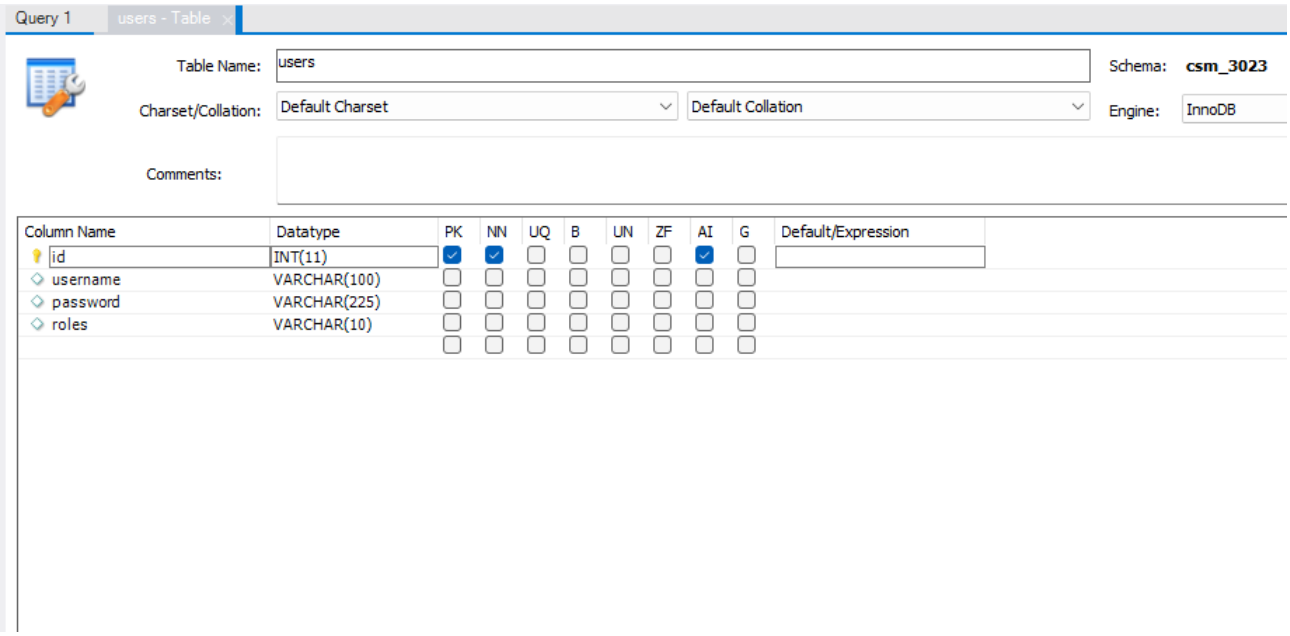
- How to make data sharing in servlet using netbenas.

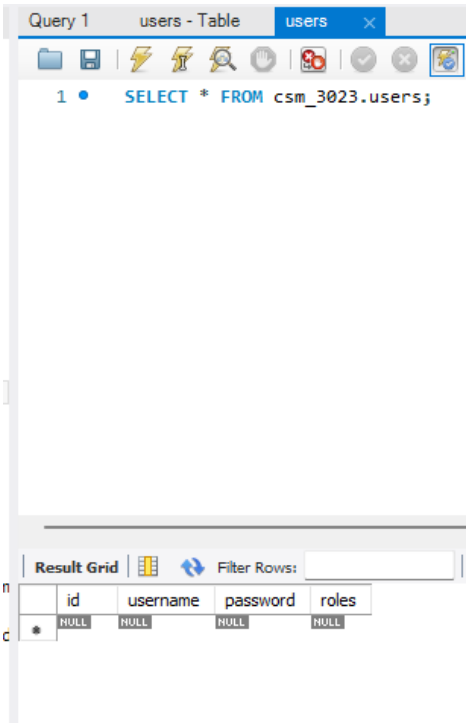
2) What are the common methods used in Java Servlet?

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

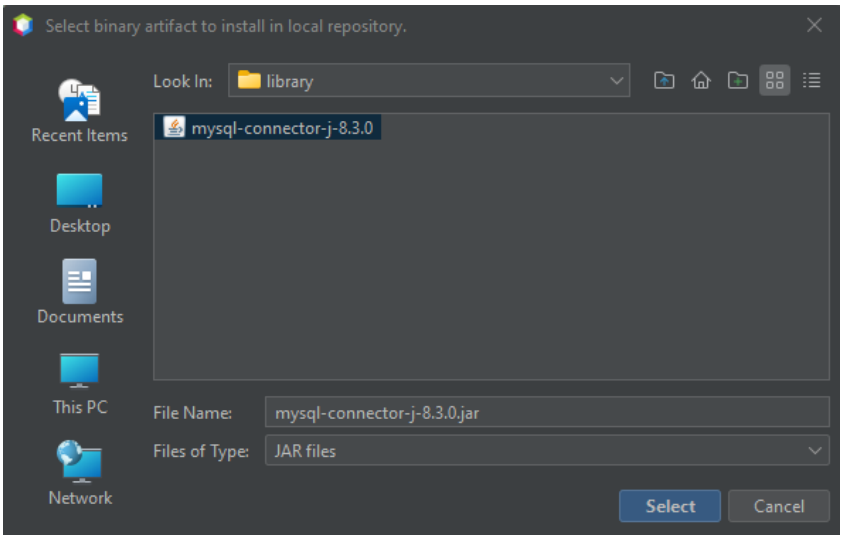
**Task 2 : Creating A Table in MySQL Database**

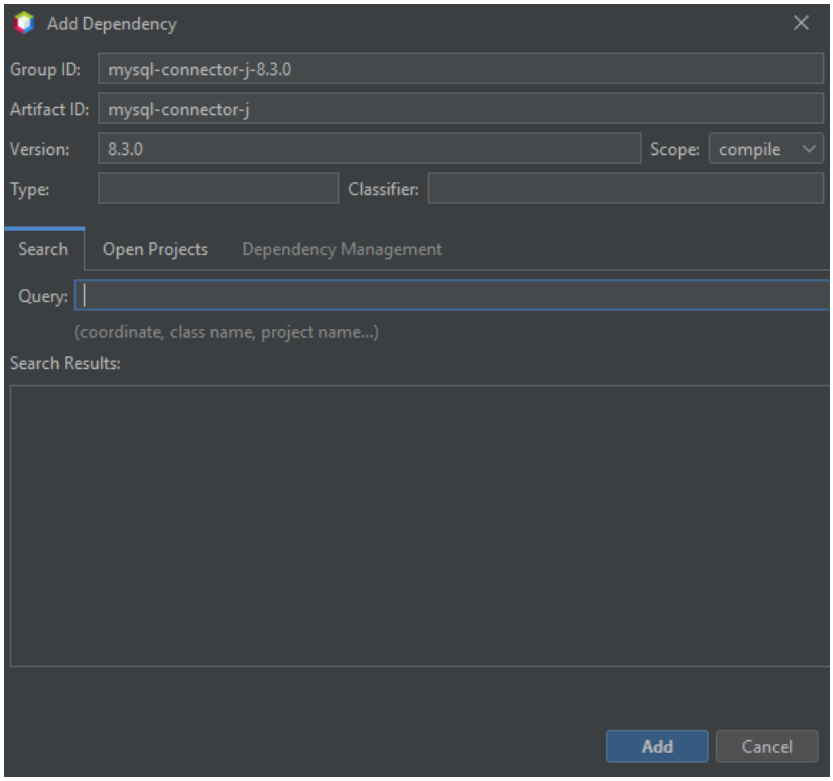


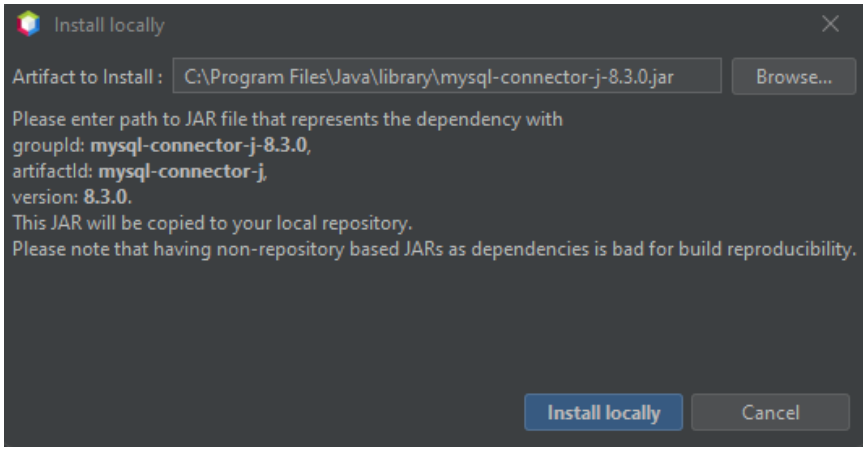



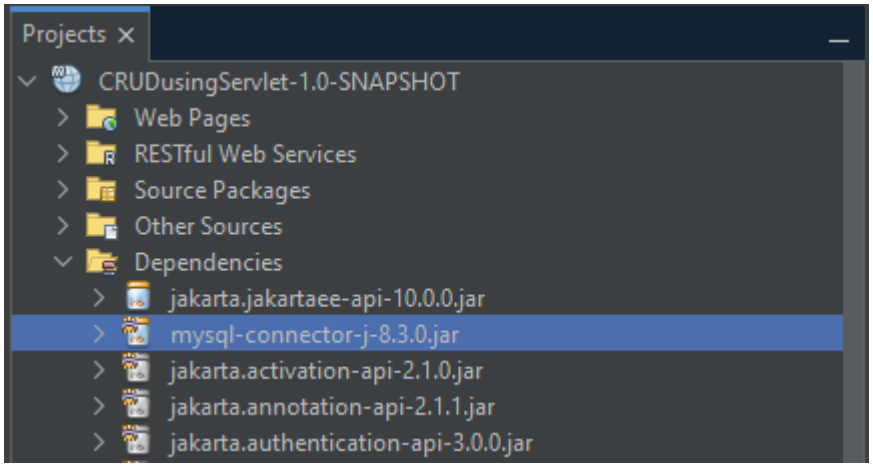



## Task 3 : Setting the Environment of Web Application for Database Connection




Add Dependency
Group ID: mysql-connector-j-8.3.0
Artifact ID: mysql-connector-j
Version: 8.3.0
Scope: compile
Type:
Classifier:
Search
Open Projects
Dependency Management
Query:
(coordinate, class name, project name...)
Search Results:
Add
Cancel


Install locally
Artifact to Install : C:\Program Files\Java\library\mysql-connector-j-8.3.0.jar
Browse...
Please enter path to JAR file that represents the dependency with
groupId: mysql-connector-j-8.3.0,
artifactId: mysql-connector-j,
version: 8.3.0.
This JAR will be copied to your local repository.
Please note that having non-repository based JARs as dependencies is bad for build reproducibility.
Install locally
Cancel




**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, inital-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

```
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

```
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

```
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;

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

```
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;


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

```
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;

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

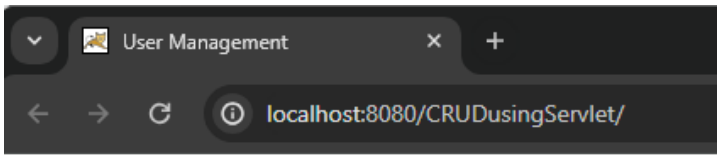
```
import java.io.IOException;
import java.io.PrintWriter;
import jakarta.servlet.ServletException;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

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

```
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;

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");
    }
```

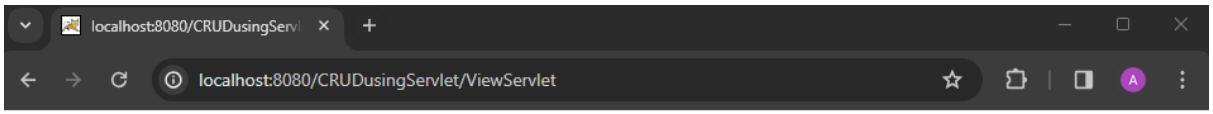
Output :




# Add New User

Username:
Password:
Role: admin
Save User

view users




Add New User

## User List

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

**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 thebusiness 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.