

Sri Lanka Institute of Information Technology

BSc (Hons) in Information Technology



IT2030 – Object Oriented Programming

Project Document

Computer Spare-parts Management System

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Introduce My Part in OOP Project

Admin – Manage User Account

Name	Manage User Accounts	
Summary	System Administrator manages user accounts by creating, updating, and deleting them as needed.	
Priority	2	
Pre-Conditions	The System Administrator is logged into the system and has get permissions to manage user accounts.	
Post-Conditions	User account management actions have been successfully executed.	
Primary Actor(s)	System Administrator	
Trigger	System Administrator manage User account, Including creating, updating and deleting them.	
Main Scenario	Step	Action
	1	Administrator create a New user account.
	2	Administrator update an Existing user account.
	3	Administrator delete a user account.
	4	Administrator views detailed information about a user account.
	5	Administrator searches for a user account.
	6	Administrator resets the password for a user account.
	7	Administrator assigns roles or permissions to a user account.
	8	Administrator locks or unlocks a user account.
	9	Administrator check the activity log linked with a user account.
	10	Administrator exports user account data to a downloadable file.
Extensions	Step	Branching Action
	1a	If required fields are missing during account creation, prompt System Administrator to provide information.
	1b	If the username/email already exists during account creation, prompt System Administrator to choose a different one.
	2a	If there are validation errors during account updates, display error messages and prompt System Administrator to correct

		them.
	3a	If the System Administrator confirms the deletion of a user account, remove the account and display a success message.
	3b	If the System Administrator cancels the deletion of a user account, return to the user account management interface.
	5a	If the search query doesn't match any user accounts, display a message indicating no results found.
	6a	If the System Administrator confirms the password reset, generate a new password for the user account and send it via email or phone number.
	6b	If the System Administrator cancels the password reset, return to the user account management interface.
	7a	If the System Administrator selects roles for a user account, assign them accordingly and display a success message.

Used Technologies

1. MySQL Work Bench 8.0

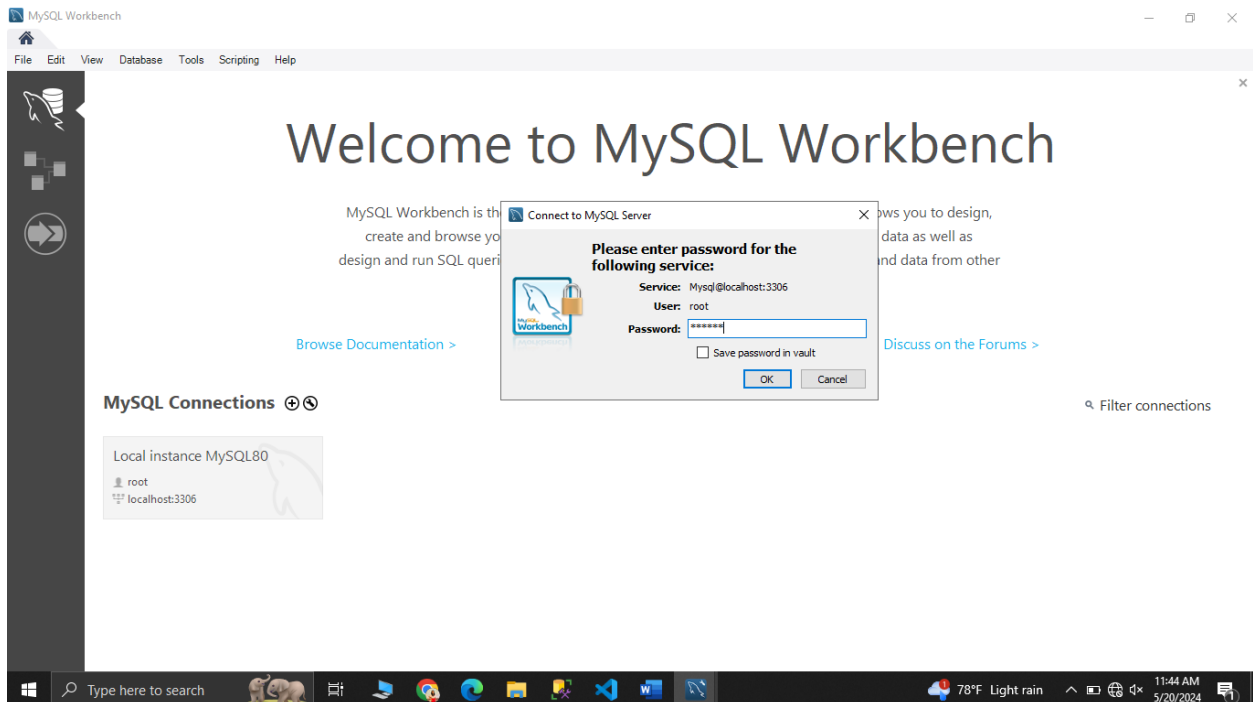
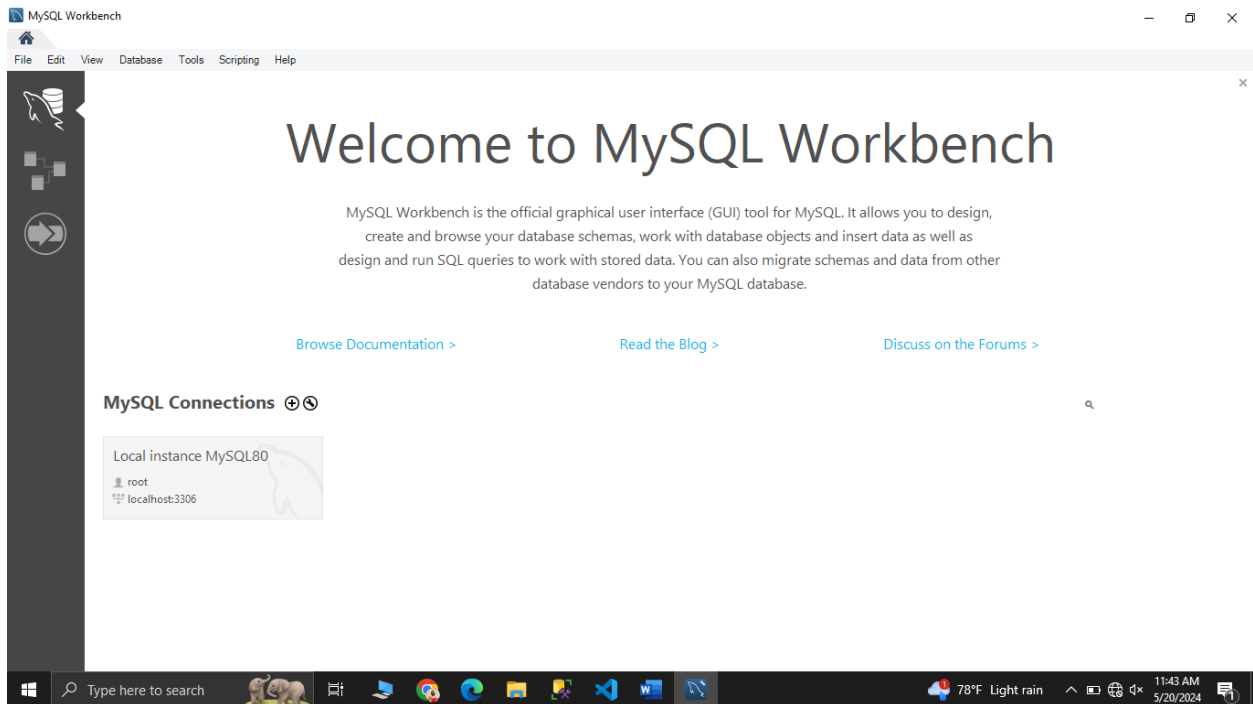
Username: root

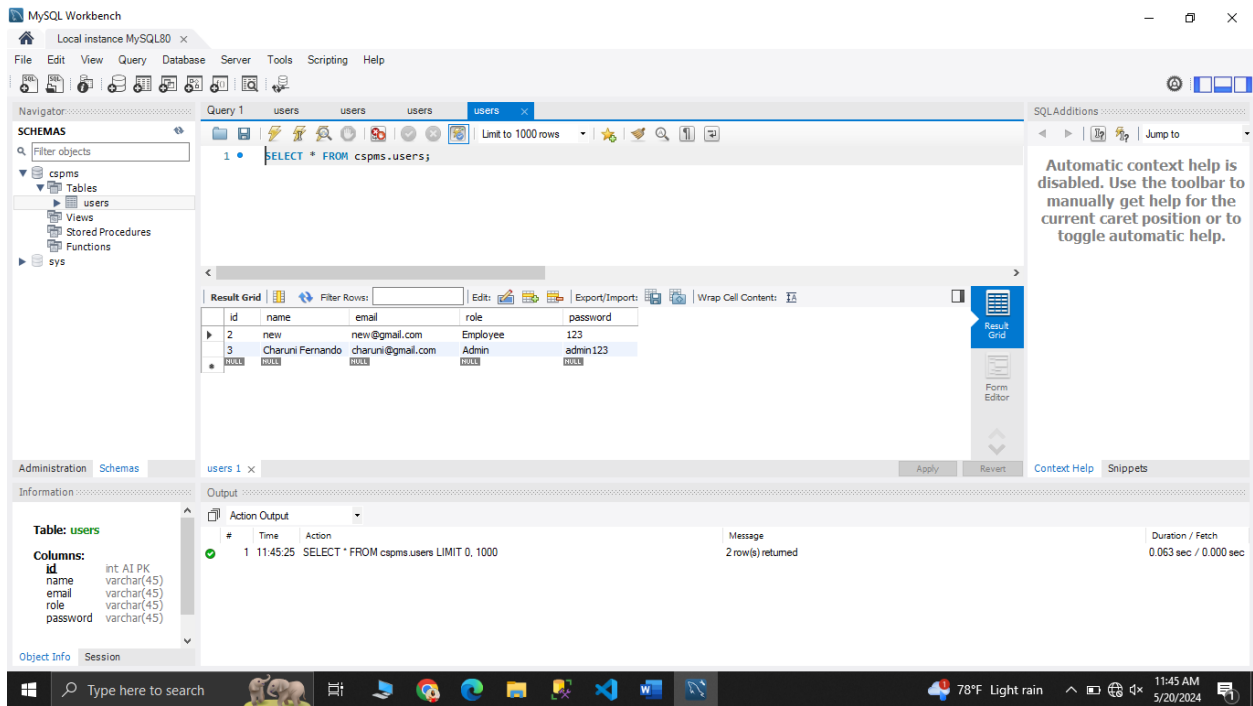
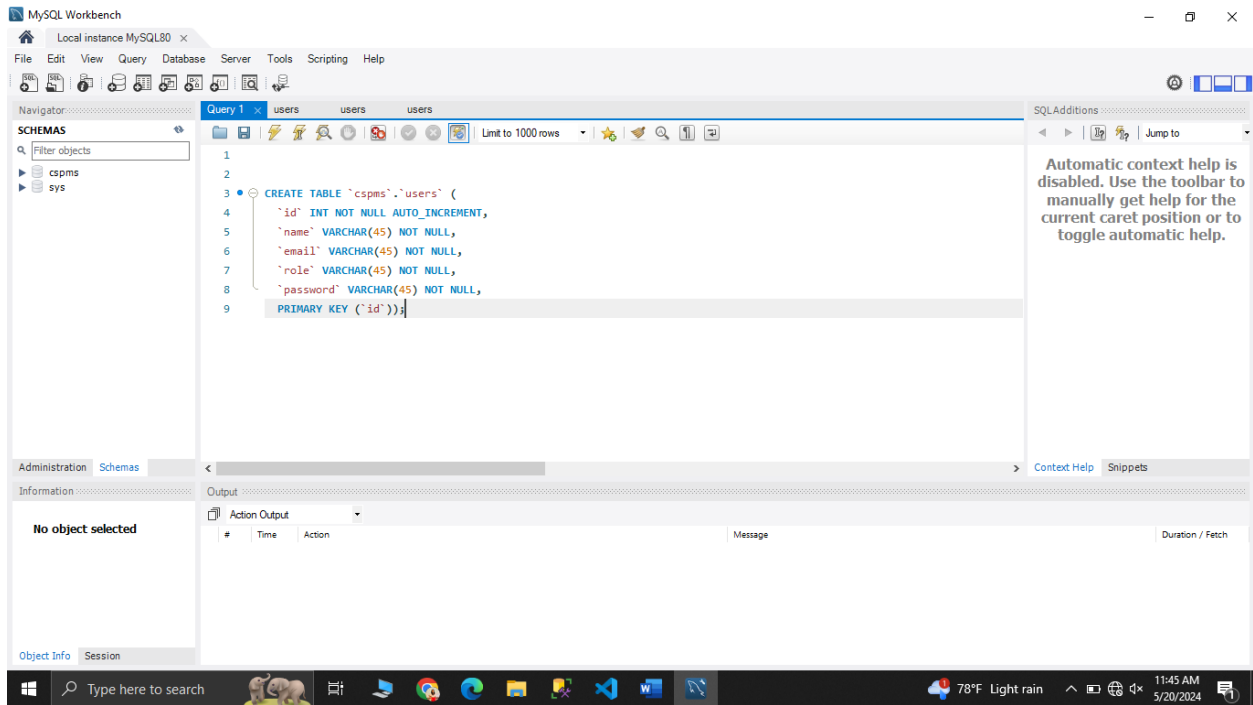
Password: 123456

2. Apache Tomcat Server 8.5

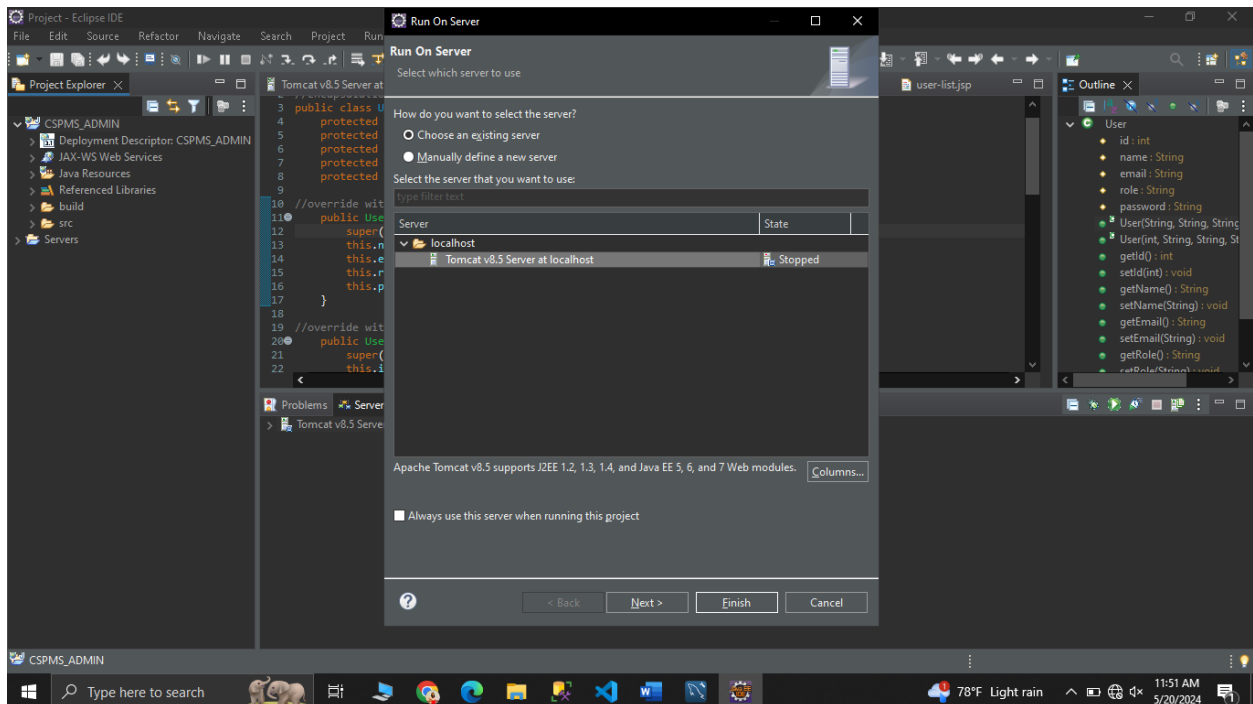
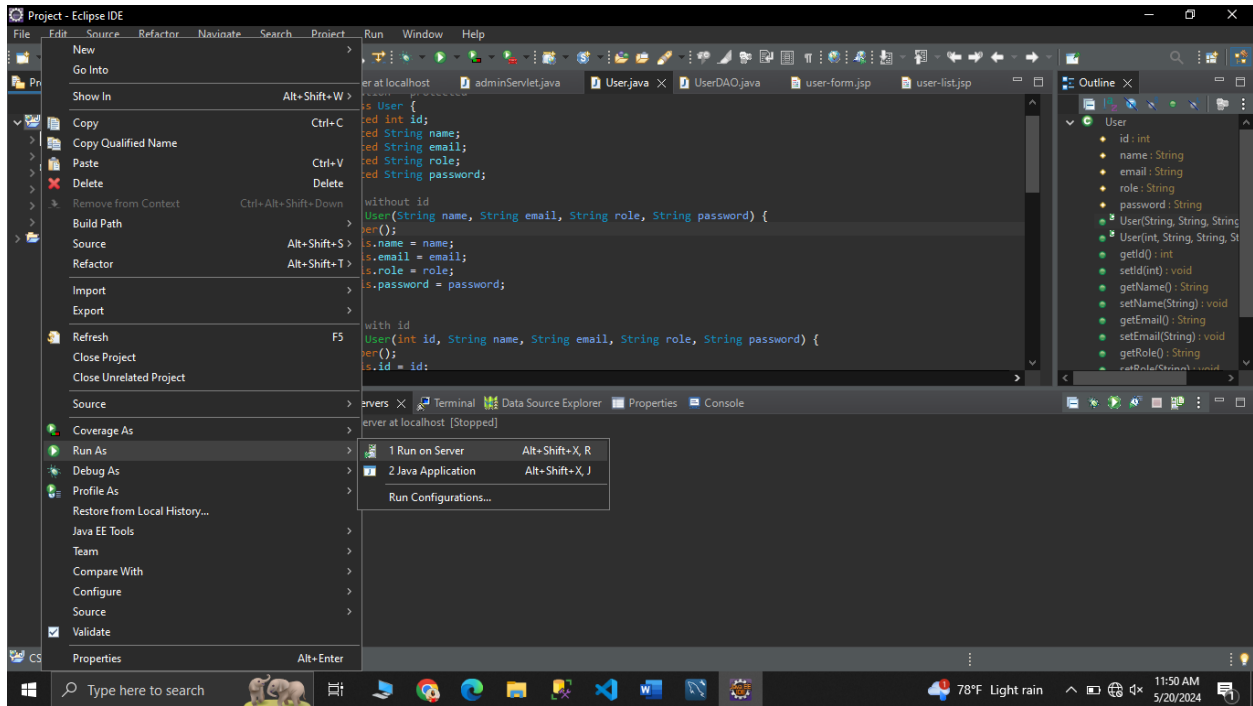
3. Eclipse IDE for Enterprise Java and Web Developers – 2024

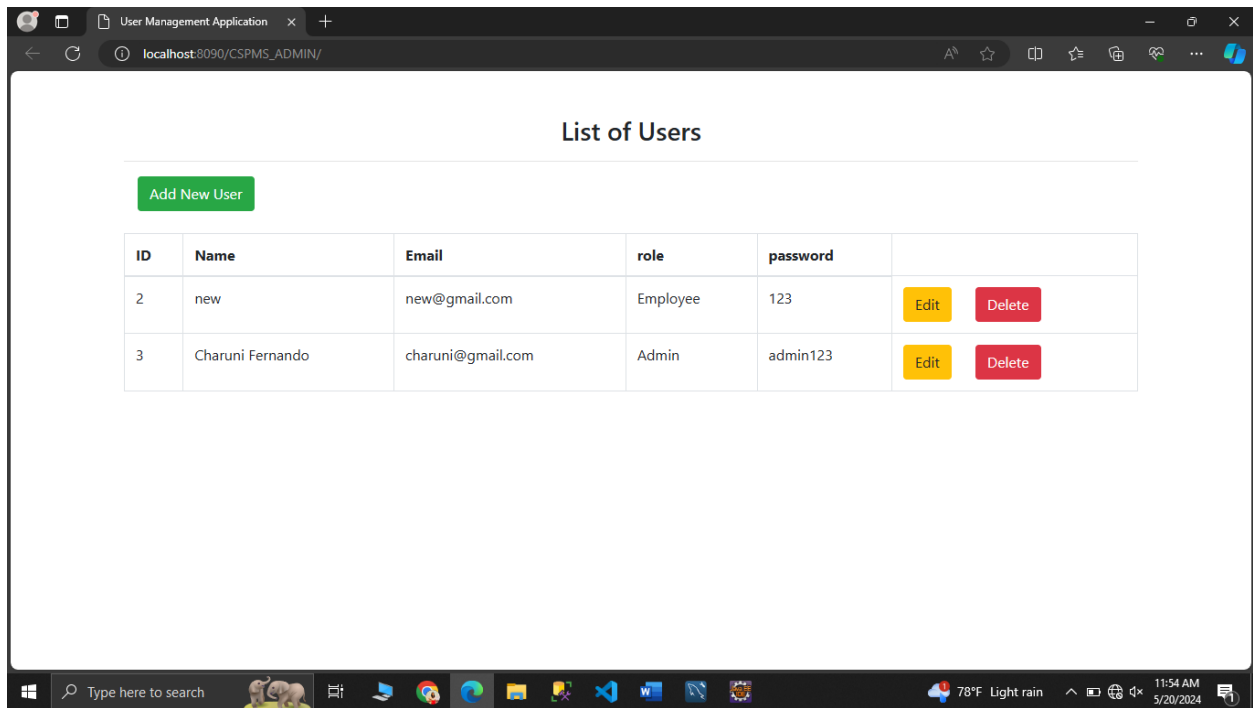
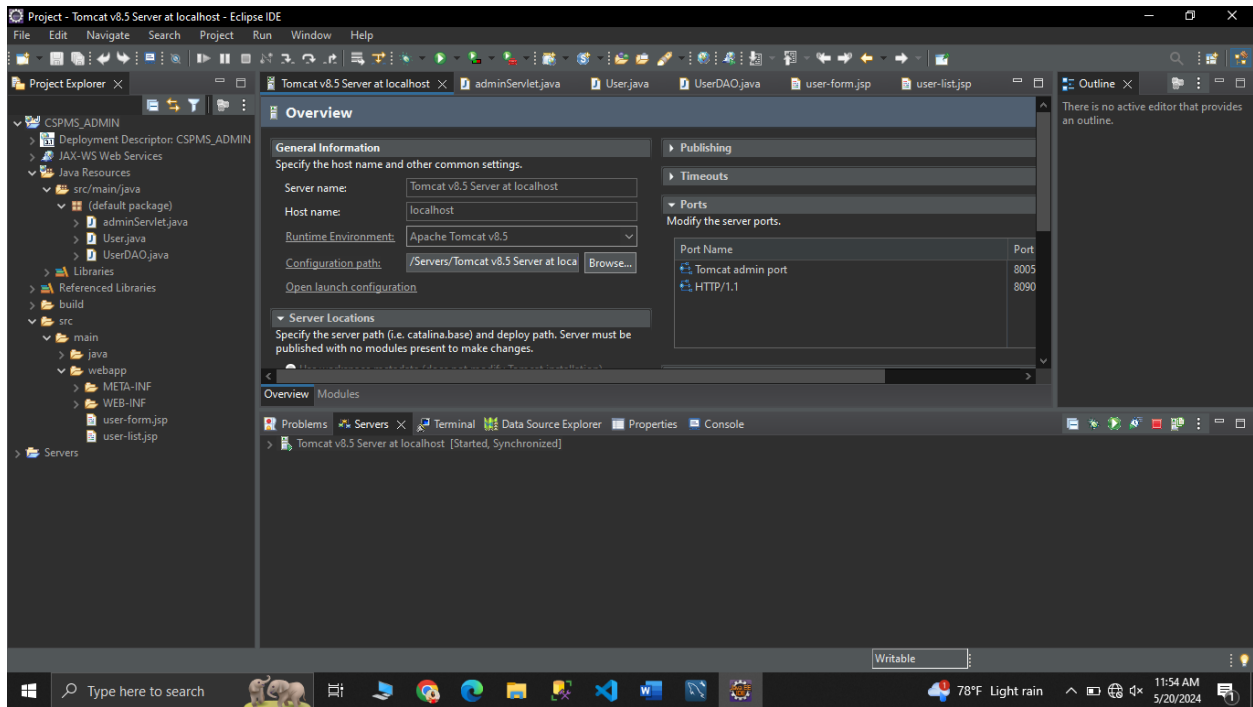
MySQL Work Bench 8.0





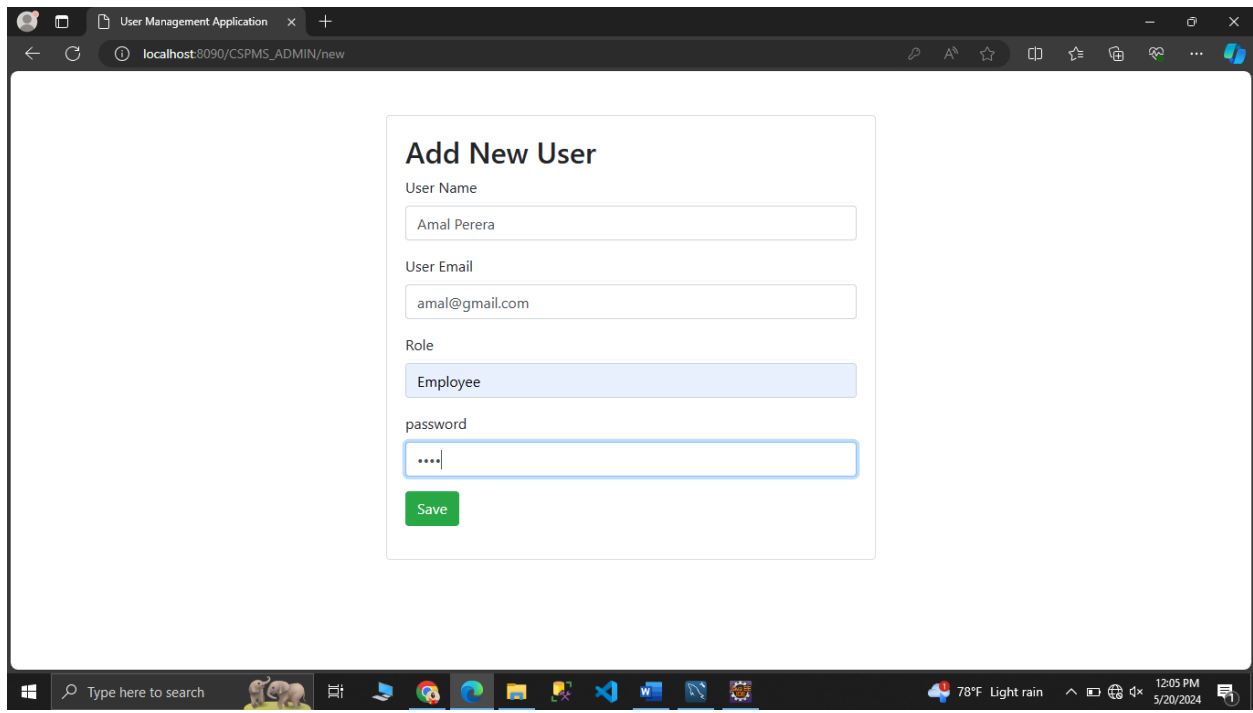
Run the Project





CRUD Operations

Insert



The screenshot shows a web browser window with the title 'User Management Application'. The address bar shows 'localhost:8090/CSPMS_ADMIN/new'. The main content area displays a form titled 'Add New User'. The form has four input fields: 'User Name' (containing 'Amal Perera'), 'User Email' (containing 'amal@gmail.com'), 'Role' (a dropdown menu with 'Employee' selected), and 'password' (containing '....'). A green 'Save' button is located at the bottom of the form.

Add New User

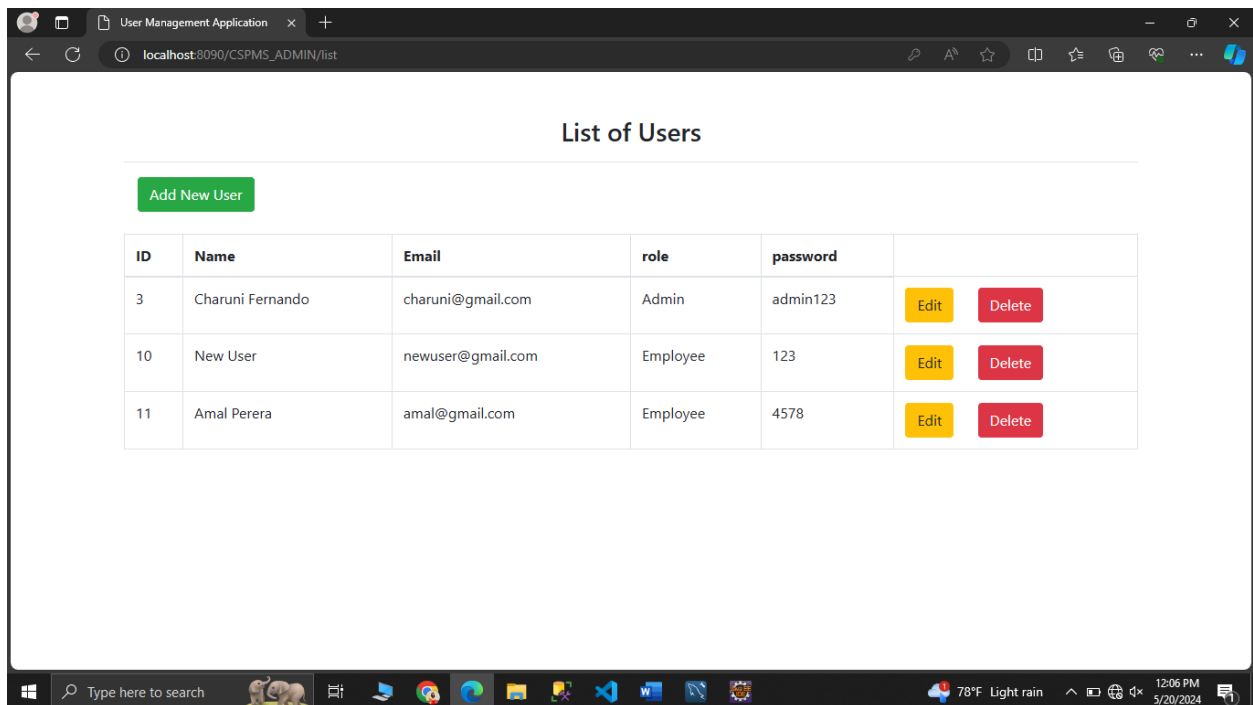
User Name
Amal Perera

User Email
amal@gmail.com

Role
Employee

password
....

Save



The screenshot shows a web browser window with the title 'User Management Application'. The address bar shows 'localhost:8090/CSPMS_ADMIN/list'. The main content area displays a table titled 'List of Users'. Above the table is a green 'Add New User' button. The table has five columns: 'ID', 'Name', 'Email', 'role', and 'password'. There are three rows of data. Each row has two buttons: 'Edit' (yellow) and 'Delete' (red).

List of Users

Add New User

ID	Name	Email	role	password	
3	Charuni Fernando	charuni@gmail.com	Admin	admin123	Edit Delete
10	New User	newuser@gmail.com	Employee	123	Edit Delete
11	Amal Perera	amal@gmail.com	Employee	4578	Edit Delete

Update

User Management Application

localhost:8090/CSPMS_ADMIN/edit?id=11

Edit User

User Name

Amal Perera Update

User Email

amal@gmail.com

Role

Employee

password

....

Save

User Management Application

localhost:8090/CSPMS_ADMIN/list

List of Users

Add New User

ID	Name	Email	role	password	
3	Charuni Fernando	charuni@gmail.com	Admin	admin123	<button>Edit</button> <button>Delete</button>
10	New User	newuser@gmail.com	Employee	123	<button>Edit</button> <button>Delete</button>
11	Amal Perera Update	amal@gmail.com	Employee	4578	<button>Edit</button> <button>Delete</button>

Delete

List of Users

[Add New User](#)

ID	Name	Email	role	password	
3	Charuni Fernando	charuni@gmail.com	Admin	admin123	Edit Delete
11	Amal Perera Update	amal@gmail.com	Employee	4578	Edit Delete

MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator: Filter objects

- cspms
 - Tables
 - users
 - Views
 - Stored Procedures
 - Functions
- sys

Query 1: `SELECT * FROM cspms.users;`

Result Grid:

id	name	email	role	password
3	Charuni Fernando	charuni@gmail.com	Admin	admin123
11	Amal Perera Up...	amal@gmail.com	Employee	4578

Table: users

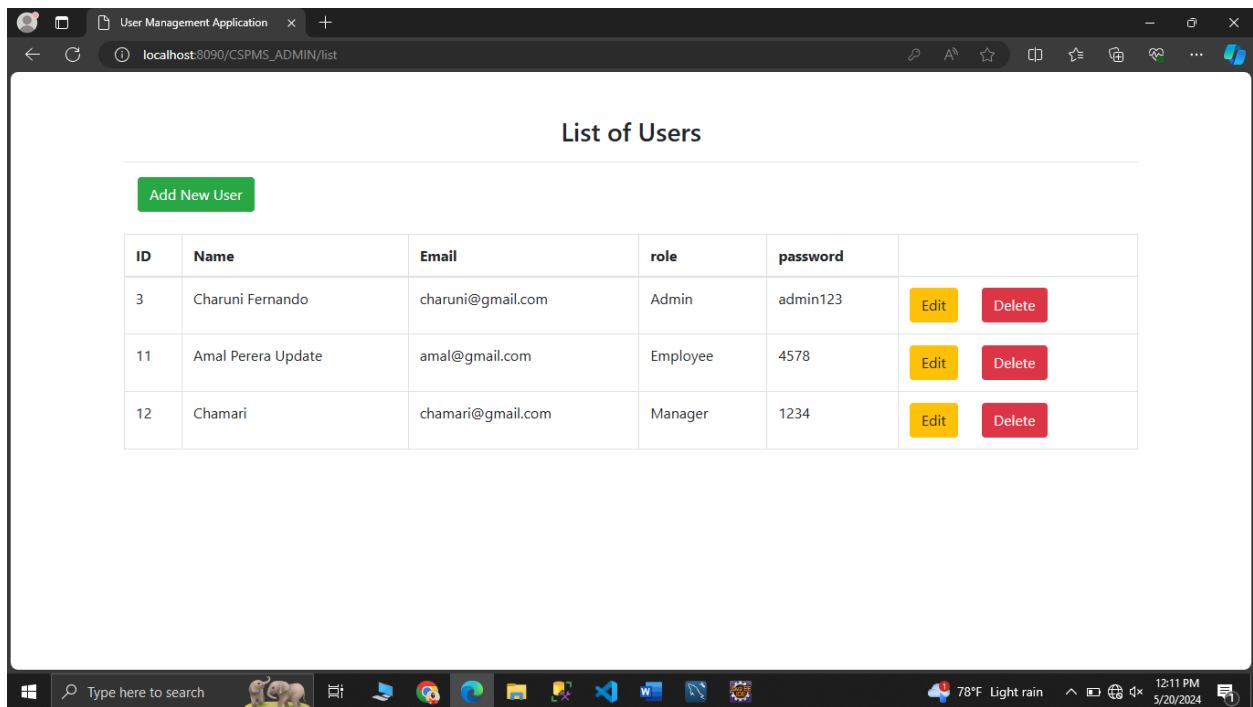
Columns:

- id: int AI PK
- name: varchar(45)
- email: varchar(45)
- role: varchar(45)
- password: varchar(45)

Output:

#	Time	Action	Message	Duration / Fetch
1	11:45:25	SELECT * FROM cspms.users LIMIT 0, 1000	2 row(s) returned	0.063 sec / 0.000 sec

Read



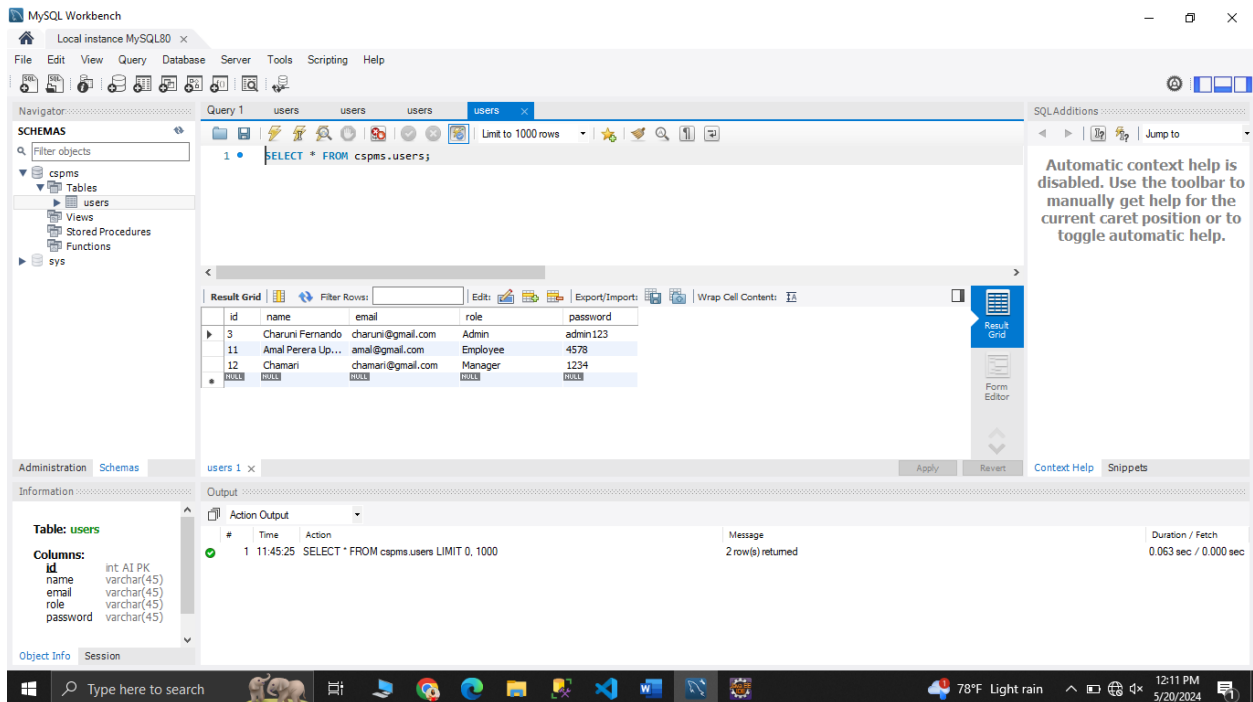
User Management Application

localhost:8090/CSPMS_ADMIN/list

List of Users

[Add New User](#)

ID	Name	Email	role	password	
3	Charuni Fernando	charuni@gmail.com	Admin	admin123	Edit Delete
11	Amal Perera Update	amal@gmail.com	Employee	4578	Edit Delete
12	Chamari	chamari@gmail.com	Manager	1234	Edit Delete



MySQL Workbench

Local instance MySQL80

File Edit View Query Database Server Tools Scripting Help

Navigator

SCHEMAS

- cspms
 - Tables
 - users
 - Views
 - Stored Procedures
 - Functions
- sys

Query 1

users users users users

Limit to 1000 rows

1 • `SELECT * FROM cspms.users;`

Result Grid

id	name	email	role	password
3	Charuni Fernando	charuni@gmail.com	Admin	admin123
11	Amal Perera Up...	amal@gmail.com	Employee	4578
12	Chamari	chamari@gmail.com	Manager	1234
* NULL	NULL	NULL	NULL	NULL

Automatic context help is disabled. Use the toolbar to manually get help for the current caret position or to toggle automatic help.

users 1 ×

Apply Revert Context Help Snippets

Information

Table: users

Columns:

- id: int AI PK
- name: varchar(45)
- email: varchar(45)
- role: varchar(45)
- password: varchar(45)

Object Info Session

Action Output

#	Time	Action	Message	Duration / Fetch
1	11:45:25	SELECT * FROM cspms.users LIMIT 0, 1000	2 row(s) returned	0.063 sec / 0.000 sec

Validations

FrontEnd Validation

The screenshot shows a web browser window with the address bar displaying 'localhost:8090/CSPMS_ADMIN/new'. The page title is 'User Management Application'. The main content is a form titled 'Add New User' with the following fields:

- User Name:** An empty text input field.
- User Email:** A text input field containing 'user@gmail.com'. A red error message bubble points to this field, stating 'Please fill out this field.'
- Role:** A dropdown menu with 'Customer support' selected.
- password:** A text input field with four dots indicating a password.
- Save:** A green button at the bottom of the form.

The browser's taskbar at the bottom shows the Windows logo, a search bar, and various application icons. The system tray on the right indicates a temperature of 78°F, light rain, and the date/time as 12:14 PM on 5/20/2024.

BackEnd Validation – Prepared Statement – avoid for SQL Injection

The screenshot shows the Eclipse IDE with a project named 'CSPMS_ADMIN'. The 'src/main/java' directory is expanded, showing the 'UserDAO.java' file. The code is as follows:

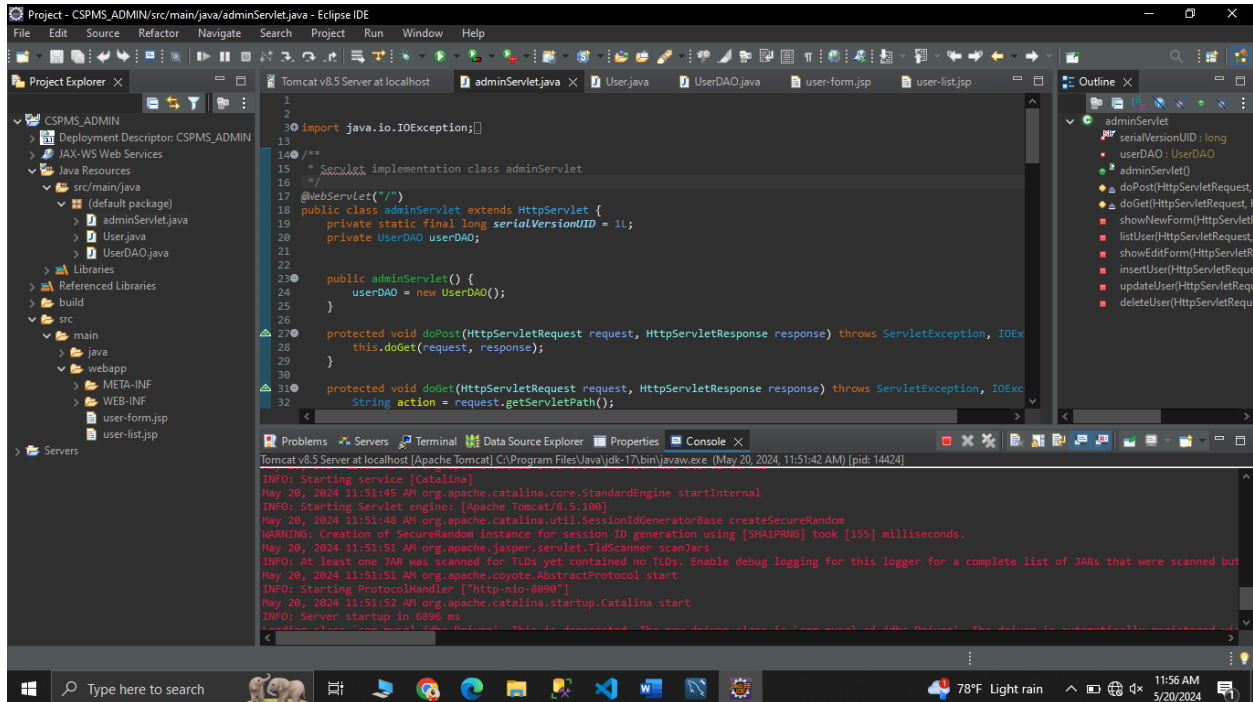
```
36 //validation using prepared statement - avoid SQL injection
37
38 public void insertUser(User user) throws SQLException {
39     System.out.println(INSERT_USERS_SQL);
40     // try-with-resource statement will auto close the connection.
41     try (Connection connection = getConnection(); PreparedStatement preparedStatement = connection.prepareStatement(INSERT_USERS_SQL)) {
42         preparedStatement.setString(1, user.getName());
43         preparedStatement.setString(2, user.getEmail());
44         preparedStatement.setString(3, user.getRole());
45         preparedStatement.setString(4, user.getPassword());
46         System.out.println(preparedStatement);
47         preparedStatement.executeUpdate();
48     } catch (SQLException e) {
49         System.out.println(e);
50     }
51 }
52
53
54 public User selectUser(int id) {
55     User user = null;
56     // Step 1: Establishing a Connection
57     try (Connection connection = getConnection();
```

The 'Console' window at the bottom shows the output of the application, including SQL statements and user data. The output is as follows:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-17\bin\javaw.exe (May 20, 2024, 11:51:42 AM) [pid: 14424]
com.mysql.cj.jdbc.ClientPreparedStatement: select * from users
INSERT INTO users (name, email, role, password) VALUES (?, ?, ?, ?);
com.mysql.cj.jdbc.ClientPreparedStatement: INSERT INTO users (name, email, role, password) VALUES ('Amal Perera', 'amal@gmail.com', 'Employee', '4578')
com.mysql.cj.jdbc.ClientPreparedStatement: select * from users
com.mysql.cj.jdbc.ClientPreparedStatement: select id,name,email,role,password from users where id =11
com.mysql.cj.jdbc.ClientPreparedStatement: select * from users
com.mysql.cj.jdbc.ClientPreparedStatement: select * from users
INSERT INTO users (name, email, role, password) VALUES (?, ?, ?, ?);
com.mysql.cj.jdbc.ClientPreparedStatement: INSERT INTO users (name, email, role, password) VALUES ('Chamari', 'chamari@gmail.com', 'Manager', '1234')
com.mysql.cj.jdbc.ClientPreparedStatement: select * from users
```

MVC Architecture

adminServlet.java



The screenshot shows the Eclipse IDE with the `adminServlet.java` file open. The code is as follows:

```
1 2
3 3 import java.io.IOException;
4
5 14 /**
6 15  * Servlet implementation class adminServlet
7 16  */
8 17 @WebServlet("/")
9 18 public class adminServlet extends HttpServlet {
10 19     private static final long serialVersionUID = 1L;
11 20     private UserDao userDao;
12 21
13 22
14 23     public adminServlet() {
15 24         userDao = new UserDao();
16 25     }
17 26
18 27     protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
19 28         this.doGet(request, response);
20 29     }
21 30
22 31     protected void doGet(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {
23 32         String action = request.getServletPath();
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```

UserDAO.java

The screenshot displays the Eclipse IDE interface. The main editor window shows the `UserDAO.java` file with the following code:

```
36
37
38 //validation using prepared statement - avoid SQL injection
39 public void insertUser(User user) throws SQLException {
40     System.out.println(INSERT_USERS_SQL);
41     // try-with-resource statement will auto close the connection.
42     try (Connection connection = getConnection(); PreparedStatement preparedStatement = connection.prepareStatement(INSERT_USERS_SQL)) {
43         preparedStatement.setString(1, user.getName());
44         preparedStatement.setString(2, user.getEmail());
45         preparedStatement.setString(3, user.getRole());
46         preparedStatement.setString(4, user.getPassword());
47         System.out.println(preparedStatement);
48         preparedStatement.executeUpdate();
49     } catch (SQLException e) {
50         System.out.println(e);
51     }
52 }
53
54 public User selectUser(int id) {
55     User user = null;
56     // Step 1: Establishing a Connection
57     try (Connection connection = getConnection();
```

The left sidebar shows the Project Explorer with the following structure:

- CSPMS_ADMIN
 - Deployment Descriptor: CSPMS_ADMIN
 - JAX-WS Web Services
 - Java Resources
 - src/main/java
 - (default package)
 - adminServlet.java
 - User.java
 - UserDAO.java
 - Libraries
 - Referenced Libraries
 - build
 - src
 - main
 - java
 - webapp
 - META-INF
 - WEB-INF
 - user-form.jsp
 - user-list.jsp

The right sidebar shows the Outline view with the following structure:

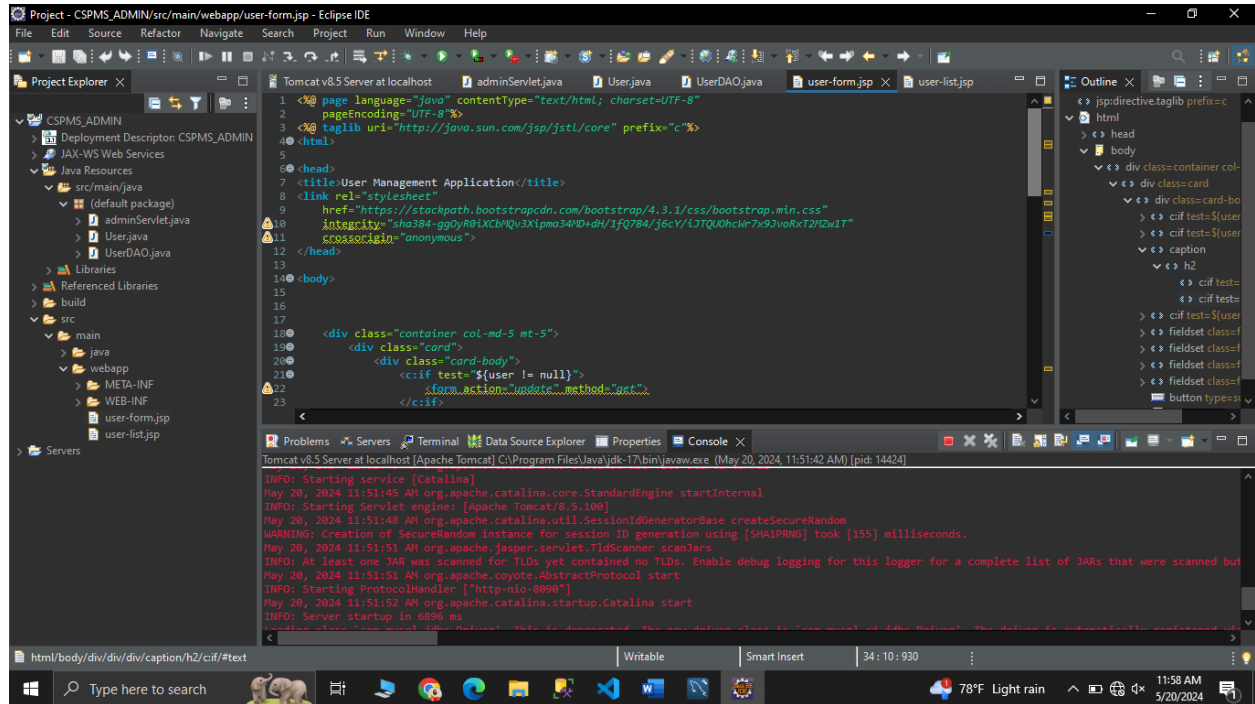
- UserDAO
 - jdbcURL : String
 - jdbcUsername : String
 - jdbcPassword : String
 - INSERT_USERS_SQL : String
 - SELECT_USER_BY_ID : String
 - SELECT_ALL_USERS : String
 - DELETE_USERS_SQL : String
 - UPDATE_USERS_SQL : String
 - getConnection() : Connection
 - insertUser(User) : void
 - selectUser(int) : User
 - selectAllUsers() : List<User>
 - deleteUser(int) : boolean
 - updateUser(User) : boolean

The bottom console window shows the Tomcat v8.5 Server at localhost output:

```
Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-17\bin\java.exe (May 20, 2024, 11:51:42 AM) [pid: 14424]
INFO: Starting service [Catalina]
May 20, 2024 11:51:45 AM org.apache.catalina.core.StandardEngine startInternal
INFO: Starting Servlet engine: [Apache Tomcat/8.5.100]
May 20, 2024 11:51:48 AM org.apache.catalina.util.SessionIdGeneratorBase createSecureRandom
WARNING: Creation of SecureRandom instance for session ID generation using [SHA1PRNG] took [155] milliseconds.
May 20, 2024 11:51:51 AM org.apache.jasper.servlet.TldScanner scanJars
INFO: At least one JAR was scanned for TLDs yet contained no TLDs. Enable debug logging for this logger for a complete list of JARs that were scanned but
May 20, 2024 11:51:51 AM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["http-nio-8090"]
May 20, 2024 11:51:52 AM org.apache.catalina.startup.Catalina start
INFO: Server startup in 6898 ms
```


Forms

user-form.jsp



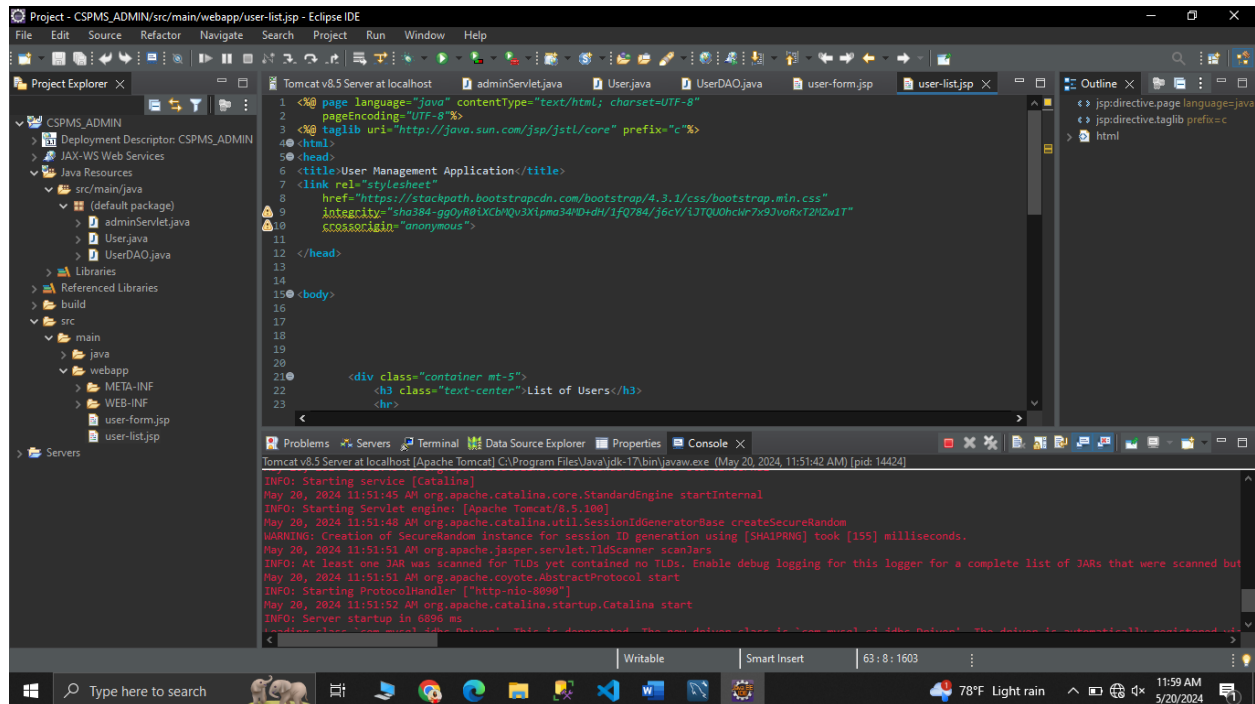
The screenshot shows the Eclipse IDE with the 'user-form.jsp' file open. The code is a JSP page for a 'User Management Application'. It includes a Bootstrap 4.3.1 CSS link and a form with a 'user' field and an 'update' button. The console shows the server startup logs for Tomcat v8.5.

```
1 <% page language="java" contentType="text/html; charset=UTF-8" %>
2 <% pageEncoding="UTF-8"%>
3 <%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
4 <%@ include file="header.jsp" %>
5 </%>
6 <html>
7 <head>
8 <title>User Management Application</title>
9 <link rel="stylesheet"
10 href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
11 integrity="sha384-ggOyR0iXCbMQv3Xipma34ND+dH/1fQ784/j6cY/13TQU0hchW7x93vofxT2N2w1T"
12 crossorigin="anonymous">
13 </head>
14 <body>
15 <div class="container col-md-5 mt-5">
16 <div class="card">
17 <div class="card-body">
18 <div class="form-group">
19 <input type="text" value="user" />
20 </div>
21 <div class="form-group">
22 <button type="button" value="update" />
23 </div>
24 </div>
25 </div>
26 </body>
27 </html>
```

Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-17\bin\javaw.exe (May 20, 2024, 11:51:42 AM) [pid: 14424]

INFO: Starting service [Catalina]
May 20, 2024 11:51:45 AM org.apache.catalina.core.StandardEngine startInternal
INFO: Starting Servlet engine: [Apache Tomcat/8.5.100]
May 20, 2024 11:51:48 AM org.apache.catalina.util.SessionIdGeneratorBase createSecureRandom
WARNING: Creation of SecureRandom instance for session ID generation using [SHA1PRNG] took [155] milliseconds.
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May 20, 2024 11:51:51 AM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["http-nio-8080"]
May 20, 2024 11:51:52 AM org.apache.catalina.startup.Catalina start
INFO: Server startup in 6096 ms

User-list.jsp



The screenshot shows the Eclipse IDE with the 'user-list.jsp' file open. The code is a JSP page for a 'User Management Application'. It includes a Bootstrap 4.3.1 CSS link and a heading 'List of Users: <h3>'. The console shows the server startup logs for Tomcat v8.5.

```
1 <% page language="java" contentType="text/html; charset=UTF-8" %>
2 <% pageEncoding="UTF-8"%>
3 <%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c"%>
4 <%@ include file="header.jsp" %>
5 </%>
6 <html>
7 <head>
8 <title>User Management Application</title>
9 <link rel="stylesheet"
10 href="https://stackpath.bootstrapcdn.com/bootstrap/4.3.1/css/bootstrap.min.css"
11 integrity="sha384-ggOyR0iXCbMQv3Xipma34ND+dH/1fQ784/j6cY/13TQU0hchW7x93vofxT2N2w1T"
12 crossorigin="anonymous">
13 </head>
14 <body>
15 <div class="container mt-5">
16 <div class="text-center">
17 <h3>List of Users:</h3>
18 </div>
19 </div>
20 </body>
21 </html>
```

Tomcat v8.5 Server at localhost [Apache Tomcat] C:\Program Files\Java\jdk-17\bin\javaw.exe (May 20, 2024, 11:51:42 AM) [pid: 14424]

INFO: Starting service [Catalina]
May 20, 2024 11:51:45 AM org.apache.catalina.core.StandardEngine startInternal
INFO: Starting Servlet engine: [Apache Tomcat/8.5.100]
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May 20, 2024 11:51:51 AM org.apache.coyote.AbstractProtocol start
INFO: Starting ProtocolHandler ["http-nio-8080"]
May 20, 2024 11:51:52 AM org.apache.catalina.startup.Catalina start
INFO: Server startup in 6096 ms