Experiment 8

Student Name: ABHIGYAN SINGH UID:22BCS14340
Branch: BE-CSE Section/Group:22BCS-KRG-IOT-3B
Semester:6th Date of Performance:15/04/2025
Subject Name: Project Based Learning in Java with Lab Subject Code: 22CSH-359

1. Aim:

(a) Write a servlet to accept user credentials through an HTML form and display a personalized welcome message if the login is successful. (EASY LEVEL)

(b) Create a servlet integrated with JDBC to display a list of employees from a database. Include a search form to fetch employee details by ID. (MEDIUM LEVEL)

(c) Develop a JSP-based student portal. Include a form for entering attendance details and save them to the database using a servlet.(HARD LEVEL)

2. Objective:

(a) To develop a simple Servlet-based login system that accepts user credentials (e.g., username and password) through an HTML form.

(b) To develop a java program to create a Servlet that interacts with a MySQL database using JDBC to fetch and display a list of employees.

(c) To develop a JSP-based Student Portal for managing student attendance. Create a form that allows users to enter attendance details (e.g., student name, ID, subject, status).Use a Servlet to save the attendance data to a MySQL database.

3. Implementation/Code:

(A) Easy Level:

```
<!DOCTYPE html>
<html>
<head>
<title>Login Form</title>
</head>
<body>
<h2>Login Page</h2>
<form action="LoginServlet" method="post">
Username: <input type="text" name="username" required><br><br>
Password: <input type="password" name="password" required><br><br>
<input type="submit" value="Login">
</form>
</body>
</html>
```

```
import java.io.*;
import javax.servlet.*;
```

```
    import javax.servlet.http.*; public class LoginServlet extends HttpServlet { private
    static final long serialVersionUID = 1L; private static final String USERNAME =
    "admin"; private static final String PASSWORD = "password123"; protected void
    doPost(HttpServletRequest request, HttpServletResponse response) throws


     ServletException, IOException {
      response.setContentType("text/html");
      PrintWriter out = response.getWriter();
      String username = request.getParameter("username");
      String password = request.getParameter("password");
      if (USERNAME.equals(username) && PASSWORD.equals(password)) {
        out.println("<html><body>");
        out.println("<h2>Welcome, " + username + "!</h2>");
        out.println("</body></html>");
      } else {
        out.println("<html><body>");
        out.println("<h2>Login failed. Invalid username or password.</h2>");
        out.println("<a href='login.html'>Try again</a>");
        out.println("</body></html>");
      }
    }
}
<web-app xmlns="http://jakarta.ee/xml/ns/jakartaee"
      version="5.0">
    <servlet>
      <servlet-name>LoginServlet</servlet-name>
      <servlet-class>LoginServlet</servlet-class>
    </servlet>
    <servlet-mapping>
      <servlet-name>LoginServlet</servlet-name>
      <url-pattern>/LoginServlet</url-pattern>
    </servlet-mapping>
</web-app>
```

(B)Medium Level:

```
<!DOCTYPE html>
<html>
<head><title>Employee Search</title></head>
<body>
    <form action="EmployeeServlet" method="get">
      Employee ID: <input type="number" name="id">
      <input type="submit" value="Search">
    </form>
</body>
</html>

import java.io.*;
import java.sql.*;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.servlet.annotation.WebServlet;
public class EmployeeServlet extends HttpServlet {
  protected void doGet(HttpServletRequest req, HttpServletResponse res) throws IOException {
    String id = req.getParameter("id");
    res.setContentType("text/html");
    PrintWriter out = res.getWriter();
    try {
      Class.forName("com.mysql.cj.jdbc.Driver");
      Connection con = DriverManager.getConnection(
        "jdbc:mysql://localhost:3306/company", "root", "your_password");
      PreparedStatement ps = con.prepareStatement("SELECT name, department FROM
   employees WHERE id=?");
      ps.setInt(1, Integer.parseInt(id));
      ResultSet rs = ps.executeQuery();
      if (rs.next()) {
        out.println("<h3>Employee Found</h3>");
        out.println("Name: " + rs.getString("name") + "<br>");
        out.println("Department: " + rs.getString("department"));
      } else {
        out.println("<h3>No employee found with ID: " + id + "</h3>");
      }
      con.close();
    } catch (Exception e) {
      out.println("Error: " + e.getMessage());
    }
  }
}
```

(C) Hard Level :

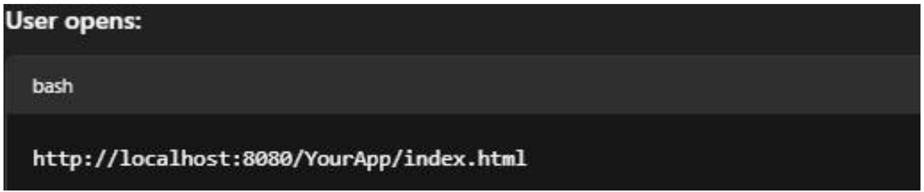
```
CREATE DATABASE student_portal;
USE student_portal;
CREATE TABLE attendance (
  id INT AUTO_INCREMENT PRIMARY KEY,
  student_name VARCHAR(100),
  roll_no VARCHAR(20),
  subject VARCHAR(100),
  attendance_date DATE,
  status VARCHAR(10)
);
```

```
<%@ page language="java" contentType="text/html; charset=UTF-8" %>
<!DOCTYPE html>
<html>
<head>
  <title>Student Attendance Form</title>
</head>
<body>
```

```
    <h2>Student Attendance Form</h2>
    <form action="AttendanceServlet" method="post">
      Name: <input type="text" name="student_name" required><br><br>
      Roll No: <input type="text" name="student_id" required><br><br>
      Subject: <input type="text" name="subject" required><br><br>
      Date: <input type="date" name="attendance_date" required><br><br>
      Status:
      <select name="status">
        <option value="Present">Present</option>
        <option value="Absent">Absent</option>
      </select><br><br>
      <input type="submit" value="Submit Attendance">
    </form>
</body>
</html>
```

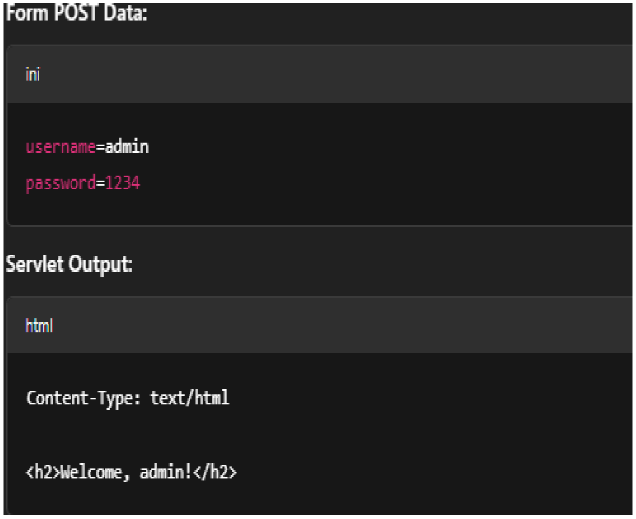
```
import java.io.*;
import java.sql.*;
import javax.servlet.*;
import javax.servlet.http.*;
import javax.servlet.annotation.WebServlet;
public class AttendanceServlet extends HttpServlet {
    protected void doPost(HttpServletRequest req, HttpServletResponse res) throws IOException,
      ServletException {
        String name = req.getParameter("student_name");
        String roll = req.getParameter("roll_no");
        String subject = req.getParameter("subject");
        String date = req.getParameter("attendance_date");
        String status = req.getParameter("status");
        res.setContentType("text/html");
        PrintWriter out = res.getWriter();
        try {
            Class.forName("com.mysql.cj.jdbc.Driver");
            Connection con = DriverManager.getConnection(
                "jdbc:mysql://localhost:3306/student_portal", "root", "your_password");
            PreparedStatement ps = con.prepareStatement(
                "INSERT INTO attendance (student_name, roll_no, subject, attendance_date, status)
      VALUES (?, ?, ?, ?, ?)"
            );
            ps.setString(1, name);
            ps.setString(2, roll);
            ps.setString(3, subject);
            ps.setString(4, date);
            ps.setString(5, status);
            int i = ps.executeUpdate();
            if (i > 0) {
                out.println("<h3>Attendance Submitted Successfully!</h3>");
            } else {
                out.println("<h3>Error submitting attendance.</h3>");
            }
            con.close();
        } catch (Exception e) {
            out.println("Error: " + e.getMessage());
        }
    }
}
```

4. Output:



User opens:

```bash
http://localhost:8080/YourApp/index.html
```



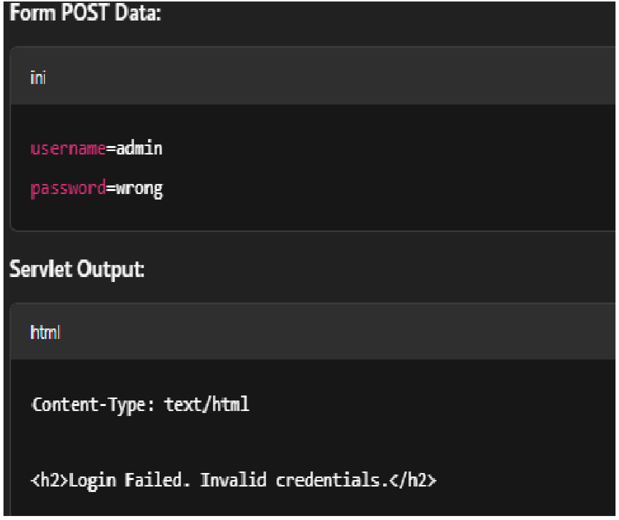
Form POST Data:

```ini
username=admin
password=1234
```

Servlet Output:

```html
Content-Type: text/html

<h2>Welcome, admin!</h2>
```

Case 1: Correct Credentials



Form POST Data:

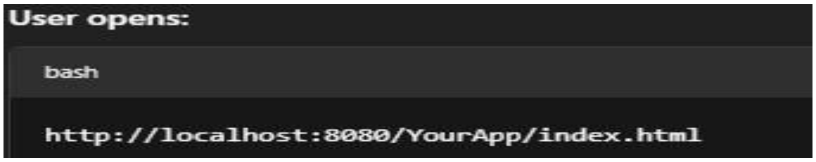
```ini
username=admin
password=wrong
```

Servlet Output:

```html
Content-Type: text/html

<h2>Login Failed. Invalid credentials.</h2>
```

Case 2: Invalid Credentials

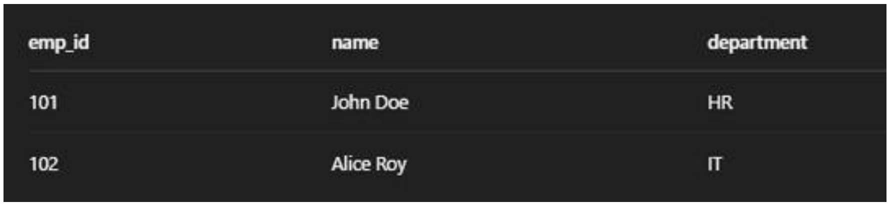
(a) Easy Level



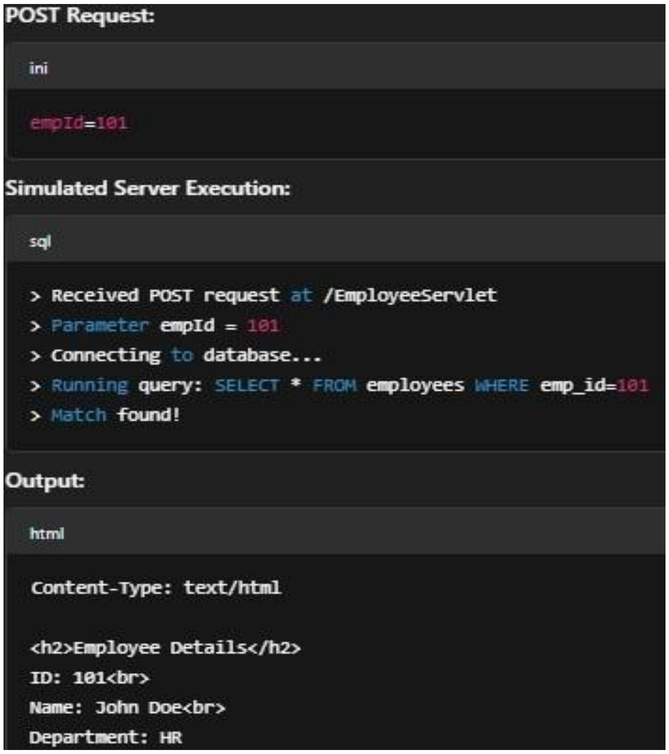
User opens:

```bash
http://localhost:8080/YourApp/index.html
```

MySQL table employees has:



emp_id	name	department
101	John Doe	HR
102	Alice Roy	IT



POST Request:

```ini
empId=101
```

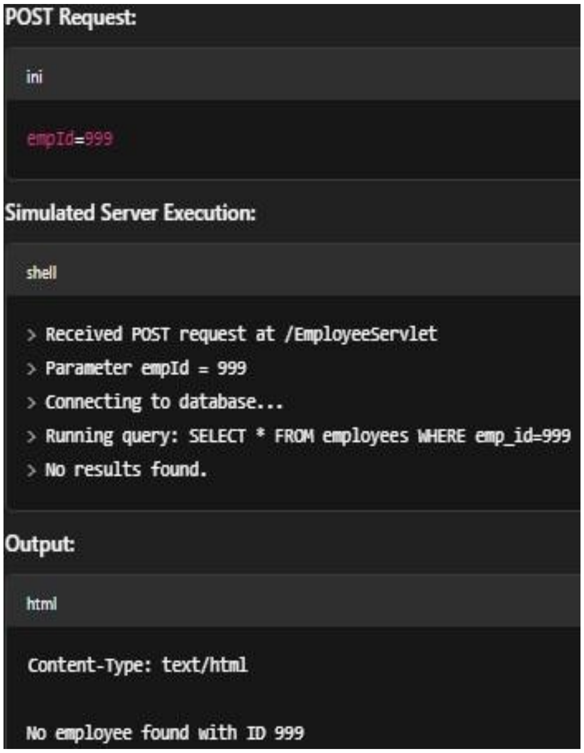
Simulated Server Execution:

```sql
> Received POST request at /EmployeeServlet
> Parameter empId = 101
> Connecting to database...
> Running query: SELECT * FROM employees WHERE emp_id=101
> Match found!
```

Output:

```html
Content-Type: text/html

<h2>Employee Details</h2>
ID: 101<br>
Name: John Doe<br>
Department: HR
```

Case 1: Employee Found



POST Request:

```ini
empId=999
```

Simulated Server Execution:

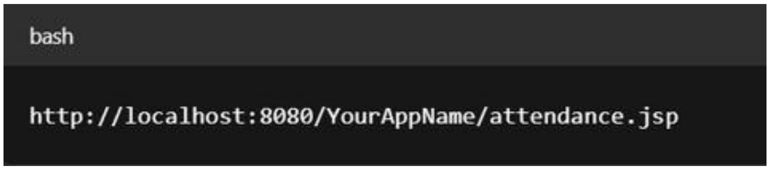
```shell
> Received POST request at /EmployeeServlet
> Parameter empId = 999
> Connecting to database...
> Running query: SELECT * FROM employees WHERE emp_id=999
> No results found.
```

Output:

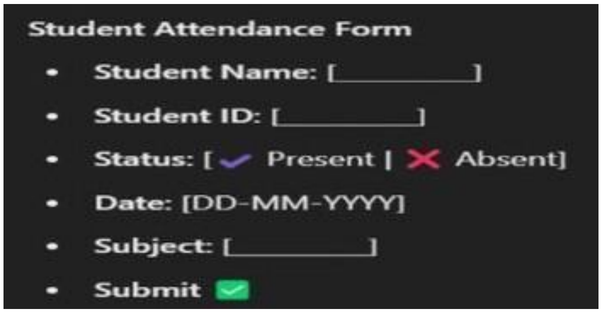
```html
Content-Type: text/html

No employee found with ID 999
```

Case 2: Employee Not Found

(b) Medium Level



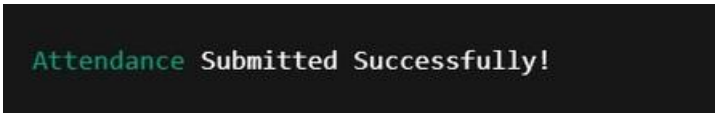
```bash
http://localhost:8080/YourAppName/attendance.jsp
```



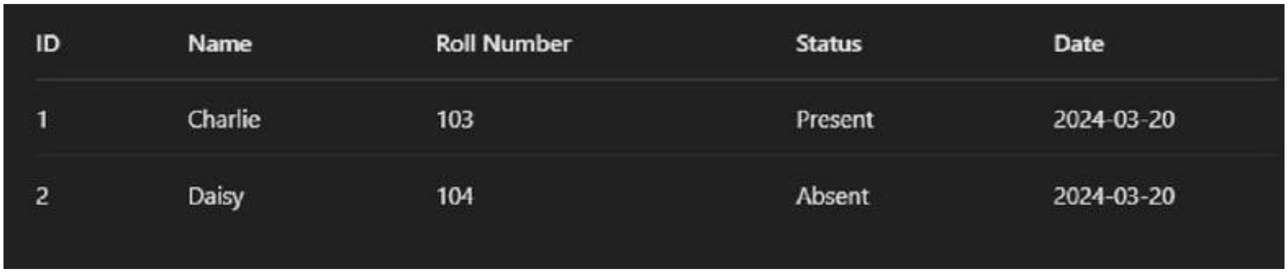
Student Attendance Form

- Student Name: [__________]
- Student ID: [__________]
- Status: [✓ Present | ✗ Absent]
- Date: [DD-MM-YYYY]
- Subject: [__________]
- Submit ✅

Student Attendance Form



```
Attendance Submitted Successfully!
```



ID	Name	Roll Number	Status	Date
1	Charlie	103	Present	2024-03-20
2	Daisy	104	Absent	2024-03-20

Viewing the attendance

(c) Hard Level

5. Learning Outcomes:

i. Enhanced proficiency in JDBC, enabling seamless database connectivity and execution of SQL queries using DriverManager, Connection, and ResultSet.

ii. Developed expertise in CRUD operations, implementing structured Create, Read, Update, and Delete functionalities while ensuring data consistency and maintaining relational integrity.

iii. Strengthened skills in transaction handling, utilizing commit() and rollback() to maintain data integrity and ensure atomicity in database operations, preventing partial or inconsistent data updates.

iv. Applied MVC architecture, separating concerns between Model, View, and Controller to enhance code maintainability, modularity, and scalability in Java applications.

v. Improved problem-solving and database management capabilities, leveraging structured programming, error handling, and SQL optimizations to build scalable, efficient, and robust applications.