**ENTERPRISE JAVA JOURNAL**

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**PRACTICAL NO. 1**

**Implement the following Simple Servlet applications.**

**a. Create a simple calculator application using servlet.**

**index.jsp**

<!DOCTYPE html>

<html>

<head>

<title>Simple Calculator</title>

</head>

<body>

<h2>Simple Calculator</h2>

<form action="calculate" method="post">

Number 1: <input type="text" name="num1" required><br><br>

Number 2: <input type="text" name="num2" required><br><br>

Operation:

<select name="operation">

<option value="add">Add (+)</option>

<option value="subtract">Subtract (-)</option>

<option value="multiply">Multiply (\*)</option>

<option value="divide">Divide (/)</option>

</select><br><br>

<input type="submit" value="Calculate">

</form>

<h3>

<% if (request.getAttribute("result") != null) { %>

Result: <%= request.getAttribute("result") %>

<% } else if (request.getAttribute("error") != null) { %>

<span style="color:red;"><%= request.getAttribute("error") %></span>

<% } %>

</h3>

</body>

</html>

**CalculatorServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class CalculatorServlet extends HttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

double num1 = Double.parseDouble(request.getParameter("num1"));

double num2 = Double.parseDouble(request.getParameter("num2"));

String operation = request.getParameter("operation");

double result = 0;

switch (operation) {

case "add": result = num1 + num2; break;

case "subtract": result = num1 - num2; break;

case "multiply": result = num1 \* num2; break;

case "divide":

if (num2 != 0) result = num1 / num2;

else request.setAttribute("error", "Cannot divide by zero.");

break;

}

request.setAttribute("result", result);

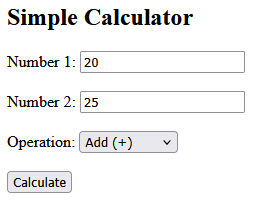
RequestDispatcher dispatcher = request.getRequestDispatcher("index.jsp");

dispatcher.forward(request, response);

}

}

**Output:**



****

**b. Create a servlet for a login page. If the username and password are correct then it says message “Hello” else a message “login failed”**

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>Login Page</title>

</head>

<body>

<h2>Login Form</h2>

<form action="LoginServlet" method="post">

Username: <input type="text" name="username" /><br><br>

Password: <input type="password" name="password" /><br><br>

<input type="submit" value="Login" />

</form>

</body>

</html>

**LoginServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.\*;

@WebServlet("/LoginServlet") // This replaces web.xml configuration

public class LoginServlet extends HttpServlet {

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 ("admin".equals(username) && "admin123".equals(password)) {

out.println("<h2>Hello " + username + "</h2>");

} else {

out.println("<h2>Login failed</h2>");

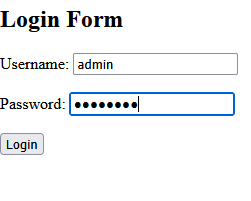
}

out.close();

}

}

**Output:**



****

**c. Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.**

**Prerequisites:**

1. Download the mysql-connector-j-9.4.0.jar file and add the jar file to your project bu following these steps -> Go to your project -> right click and go to properties -> select the option libraries -> click Add jar file -> select the jar file from your local machine (Go to the path where you have kept the downloaded jar file in your system) and click ok.
2. Create a database and a table as follows:

CREATE DATABASE userdb;

USE userdb;

CREATE TABLE users (

id INT AUTO\_INCREMENT PRIMARY KEY,

username VARCHAR(50) NOT NULL,

password VARCHAR(50) NOT NULL,

email VARCHAR(100),

country VARCHAR(50)

);

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>User Registration</title>

</head>

<body>

<h2>Register Here</h2>

<form action="RegisterServlet" method="post">

Username: <input type="text" name="username" required><br><br>

Password: <input type="password" name="password" required><br><br>

Email: <input type="email" name="email" required><br><br>

Country: <input type="text" name="country" required><br><br>

<input type="submit" value="Register">

</form>

</body>

</html>

**RegisterServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.\*;

import java.sql.\*;

@WebServlet("/RegisterServlet")

public class RegisterServlet extends HttpServlet {

private static final String JDBC\_URL = "jdbc:mysql://localhost:3306/userdb";

private static final String DB\_USER = "root"; // your DB username

private static final String DB\_PASS = ""; // your DB password

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

// Get form values

String username = request.getParameter("username");

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

String email = request.getParameter("email");

String country = request.getParameter("country");

response.setContentType("text/html");

PrintWriter out = response.getWriter();

try {

// Load JDBC Driver

Class.forName("com.mysql.cj.jdbc.Driver");

// Connect to DB

Connection conn = DriverManager.getConnection(

"jdbc:mysql://localhost:3306/userdb", "root", "root");

// Insert query

String sql = "INSERT INTO users (username, password, email, country) VALUES (?, ?, ?, ?)";

PreparedStatement stmt = conn.prepareStatement(sql);

stmt.setString(1, username);

stmt.setString(2, password);

stmt.setString(3, email);

stmt.setString(4, country);

int rows = stmt.executeUpdate();

if (rows > 0) {

out.println("<h2>Registration successful!</h2>");

} else {

out.println("<h2>Registration failed.</h2>");

}

conn.close();

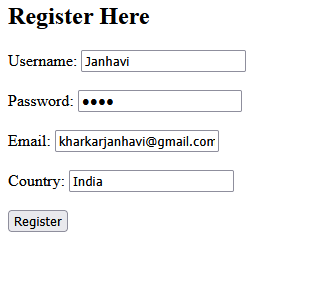
} catch (Exception e) {

e.printStackTrace(out);

}

}

**Output:**

****

**PRACTICAL NO. 2**

**Implement the following Servlet applications with Cookies and Sessions.**

**a. Using Request Dispatcher Interface create a Servlet which will validate the password entered by the user, if the user has entered "Servlet" as password, then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.**

***Note:*** Keep the **WelcomeServlet.java** in the default packageand **ValidateServlet.java** in the **ValidateServlet** package.

**index.jsp**

<!DOCTYPE html>

<html>

<head>

<title>Password Validation</title>

</head>

<body>

<h2>Login Page</h2>

<form action="ValidateServlet" method="post">

Enter Password: <input type="password" name="password" />

<input type="submit" value="Login" />

</form>

<p style="color:red;">

${errorMsg}

</p>

</body>

</html>

**WelcomeServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class WelcomeServlet extends HttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html");

PrintWriter out = response.getWriter();

out.println("<h2>Welcome! You have successfully logged in.</h2>");

}

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

doPost(request, response);

}

}

**ValidateServlet/ValidateServlet.java**

package ValidateServlet;

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class ValidateServlet extends HttpServlet {

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

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

if ("Servlet".equals(password)) {

// Forward to WelcomeServlet if password is correct

RequestDispatcher rd = request.getRequestDispatcher("WelcomeServlet");

rd.forward(request, response);

} else {

// Stay on index.html with error message

PrintWriter out = response.getWriter();

RequestDispatcher rd = request.getRequestDispatcher("index.jsp");

rd.include(request, response); // include index.html content

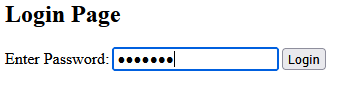
out.println("<center><p style='color:red;'>Invalid Password! Try Again.</p></center>");

}

}

}

**Output:**



**Enter the password as: Servlet**



**b. Create a servlet that uses Cookies to store the number of times a user has visited servlet.**

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>Visit Counter App</title>

</head>

<body>

<h2>Welcome!</h2>

<p><a href="VisitCounterServlet">Click here to check visit count</a></p>

</body>

</html>

**VisitCounterServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class VisitCounterServlet extends HttpServlet {

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html");

PrintWriter out = response.getWriter();

int visitCount = 0;

// Get cookies from request

Cookie[] cookies = request.getCookies();

if (cookies != null) {

for (Cookie c : cookies) {

if (c.getName().equals("visitCount")) {

// Retrieve the old count

visitCount = Integer.parseInt(c.getValue());

}

}

}

// Increment the count

visitCount++;

// Store updated count back into a cookie

Cookie visitCookie = new Cookie("visitCount", String.valueOf(visitCount));

visitCookie.setMaxAge(60 \* 60 \* 24);

response.addCookie(visitCookie);

// Display result

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

out.println("<h2>Welcome to the Visit Counter Servlet</h2>");

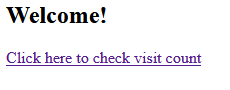
out.println("<p>You have visited this page <b>" + visitCount + "</b> times.</p>");

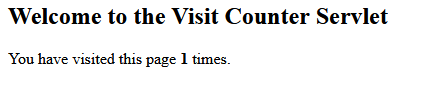
out.println("</body></html>");

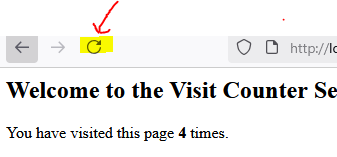
}

}

**Output:**







**c. Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.**

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>Session Demo</title>

</head>

<body>

<h1>Session Tracking Example</h1>

<p>Click below to test session creation and visit tracking.</p>

<!-- Link to servlet -->

<form action="SessionServlet" method="get">

<input type="submit" value="Go to Session Servlet">

</form>

</body>

</html>

**SessionServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class SessionServlet extends HttpServlet {

@Override

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html");

PrintWriter out = response.getWriter();

// Get or create session

HttpSession session = request.getSession();

// Check if it's a new session

if (session.isNew()) {

out.println("<h2>Welcome! This is your first visit.</h2>");

session.setAttribute("visitCount", 1); // start counting visits

} else {

Integer count = (Integer) session.getAttribute("visitCount");

if (count == null) count = 0;

count++;

session.setAttribute("visitCount", count);

out.println("<h2>Welcome back! You have visited this page " + count + " times.</h2>");

}

// Display session details

out.println("<p>Session ID: " + session.getId() + "</p>");

out.println("<p>Session Creation Time: " + new java.util.Date(session.getCreationTime()) + "</p>");

out.println("<p>Last Accessed Time: " + new java.util.Date(session.getLastAccessedTime()) + "</p>");

// Option to destroy the session

out.println("<form action='' method='post'>");

out.println("<input type='submit' value='Logout (Destroy Session)'>");

out.println("</form>");

}

@Override

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

HttpSession session = request.getSession(false); // don't create new if not exists

if (session != null) {

session.invalidate(); // destroy session

}

response.setContentType("text/html");

PrintWriter out = response.getWriter();

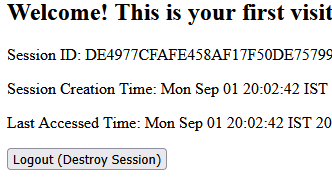
out.println("<h2>Session destroyed. Please refresh to create a new session.</h2>");

}

}

**Output:**







**PRACTICAL NO. 3**

**Implement the Servlet IO and File applications.**

**a. Create a Servlet application to upload and download a file.**

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>File Upload and Download</title>

</head>

<body>

<h2>Upload File</h2>

<form action="UploadServlet" method="post" enctype="multipart/form-data">

<input type="file" name="file"><br><br>

<input type="submit" value="Upload">

</form>

<h2>Download File</h2>

<form action="DownloadServlet" method="get">

<input type="text" name="filename" placeholder="Enter file name"><br><br>

<input type="submit" value="Download">

</form>

</body>

</html>

**UploadServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.annotation.MultipartConfig;

import javax.servlet.http.\*;

@MultipartConfig

public class UploadServlet extends HttpServlet {

private static final String UPLOAD\_DIR = "uploads";

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

Part filePart = request.getPart("file"); // get file

String fileName = filePart.getSubmittedFileName();

// Save file to uploads folder inside webapp

String uploadPath = getServletContext().getRealPath("") + File.separator + UPLOAD\_DIR;

File uploadDir = new File(uploadPath);

if (!uploadDir.exists()) uploadDir.mkdir();

filePart.write(uploadPath + File.separator + fileName);

response.setContentType("text/html");

PrintWriter out = response.getWriter();

out.println("<h3>File " + fileName + " uploaded successfully!</h3>");

out.println("<a href='index.html'>Back</a>");

}

}

**DownloadServlet.java**

import java.io.\*;

import javax.servlet.\*;

import javax.servlet.http.\*;

public class DownloadServlet extends HttpServlet {

private static final String UPLOAD\_DIR = "uploads";

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

String fileName = request.getParameter("filename");

String filePath = getServletContext().getRealPath("") + File.separator + UPLOAD\_DIR + File.separator + fileName;

File downloadFile = new File(filePath);

if (!downloadFile.exists()) {

response.getWriter().println("<h3>File not found: " + fileName + "</h3>");

return;

}

FileInputStream inStream = new FileInputStream(downloadFile);

// Set MIME type

String mimeType = getServletContext().getMimeType(filePath);

if (mimeType == null) {

mimeType = "application/octet-stream";

}

response.setContentType(mimeType);

response.setContentLength((int) downloadFile.length());

// Set response header

response.setHeader("Content-Disposition", "attachment; filename=\"" + downloadFile.getName() + "\"");

// Write file to response

OutputStream outStream = response.getOutputStream();

byte[] buffer = new byte[4096];

int bytesRead;

while ((bytesRead = inStream.read(buffer)) != -1) {

outStream.write(buffer, 0, bytesRead);

}

inStream.close();

outStream.close();

}

}

**Output:**







**b. Develop Simple Servlet Question Answer Application using Database.**

**Prerequisites:**

Create a database as follows:

CREATE DATABASE qadb;

USE qadb;

CREATE TABLE qa(id INT AUTO\_INCREMENT PRIMARY KEY,question VARCHAR(255),answer VARCHAR(255));

**index.html**

<!DOCTYPE html>

<html>

<head><title>Q&A App</title></head>

<body>

<h2>Add Question & Answer</h2>

<form action="QAServlet" method="post">

Question: <input type="text" name="question"><br><br>

Answer: <input type="text" name="answer"><br><br>

<input type="submit" value="Save">

</form>

<br>

<a href="QAServlet">View All</a>

</body>

</html>

**QAServlet.java**

import javax.servlet.\*;

import javax.servlet.http.\*;

import java.io.\*;

import java.sql.\*;

import java.util.\*;

public class QAServlet extends HttpServlet {

Connection con;

public void init() {

try {

Class.forName("com.mysql.cj.jdbc.Driver");

con = DriverManager.getConnection(

"jdbc:mysql://localhost:3306/qadb", "root", "root"); // change pass if needed

} catch (Exception e) { e.printStackTrace(); }

}

protected void doPost(HttpServletRequest req, HttpServletResponse res)

throws ServletException, IOException {

String q = req.getParameter("question");

String a = req.getParameter("answer");

try {

PreparedStatement ps = con.prepareStatement(

"INSERT INTO qa(question, answer) VALUES(?,?)");

ps.setString(1, q);

ps.setString(2, a);

ps.executeUpdate();

} catch (Exception e) { e.printStackTrace(); }

res.sendRedirect("QAServlet");

}

protected void doGet(HttpServletRequest req, HttpServletResponse res)

throws ServletException, IOException {

res.setContentType("text/html");

PrintWriter out = res.getWriter();

out.println("<h2>Saved Q&A</h2><table border=1><tr><th>Question</th><th>Answer</th></tr>");

try {

Statement st = con.createStatement();

ResultSet rs = st.executeQuery("SELECT question, answer FROM qa");

while (rs.next()) {

out.println("<tr><td>"+rs.getString(1)+"</td><td>"+rs.getString(2)+"</td></tr>");

}

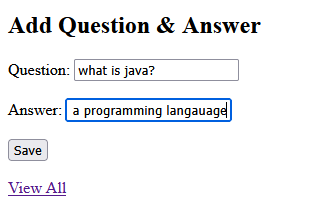
} catch (Exception e) { e.printStackTrace(); }

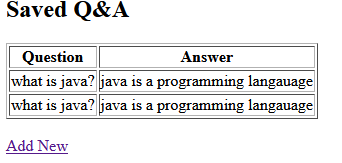
out.println("</table><br><a href='index.html'>Add New</a>");

}

}

**Output:**





**c. Create simple Servlet application to demonstrate Non-Blocking Read Operation.**

**index.html**

<!DOCTYPE html>

<html>

<head>

<title>Non-Blocking Read Demo</title>

</head>

<body>

<h2>Non-Blocking Servlet Read Example</h2>

<form action="NonBlockingServlet" method="post">

<textarea name="data" rows="5" cols="40"></textarea><br><br>

<input type="submit" value="Send Data">

</form>

</body>

</html>

**NonBlockingServlet.java**

import java.io.IOException;

import java.nio.charset.StandardCharsets;

import javax.servlet.\*;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.\*;

@WebServlet(urlPatterns = "/nonBlockingServlet", asyncSupported = true)

public class NonBlockingServlet extends HttpServlet {

@Override

protected void doPost(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

// Start async mode

AsyncContext asyncContext = request.startAsync();

ServletInputStream input = request.getInputStream();

input.setReadListener(new ReadListener() {

private StringBuilder buffer = new StringBuilder();

@Override

public void onDataAvailable() throws IOException {

byte[] b = new byte[1024];

int len;

while (input.isReady() && (len = input.read(b)) != -1) {

buffer.append(new String(b, 0, len, StandardCharsets.UTF\_8));

}

}

@Override

public void onAllDataRead() throws IOException {

HttpServletResponse resp = (HttpServletResponse) asyncContext.getResponse();

resp.setContentType("text/plain");

resp.getWriter().write("Data received (Non-Blocking):\n");

resp.getWriter().write(buffer.toString());

asyncContext.complete(); // must end async

}

@Override

public void onError(Throwable t) {

try {

HttpServletResponse resp = (HttpServletResponse) asyncContext.getResponse();

resp.getWriter().write("Error: " + t.getMessage());

} catch (IOException e) {

e.printStackTrace();

} finally {

asyncContext.complete();

}

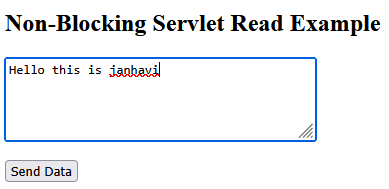
}

});

}

}

**Output:**





**PRACTICAL NO. 4**

**Implement the following JSP applications.**

**a. Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.**

**index.jsp**

<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>

<!DOCTYPE html>

<html>

<head>

<title>Intrinsic Objects Example</title>

</head>

<body>

<h2>Enter Your Name</h2>

<form action="info.jsp" method="post">

Name: <input type="text" name="uname" />

<input type="submit" value="Submit" />

</form>

</body>

</html>

**info.jsp**

<%@ page import="java.util.Date" %>

<!DOCTYPE html>

<html>

<head>

<title>Intrinsic Objects Example</title>

</head>

<body>

<h2>Values from Intrinsic Objects</h2>

<%

// Request object

String name = request.getParameter("uname");

// Session object

session.setAttribute("username", name);

// Application object

application.setAttribute("appMsg", "This message is stored in application scope");

// Response object - set content type

response.setContentType("text/html");

// Out object - printing message

out.println("<p><b>Welcome, " + name + "</b></p>");

%>

<p><b>Request Object:</b> Your name = <%= request.getParameter("uname") %></p>

<p><b>Session Object:</b> Username stored in session = <%= session.getAttribute("username") %></p>

<p><b>Application Object:</b> <%= application.getAttribute("appMsg") %></p>

<p><b>Response Object:</b> Content type set = <%= response.getContentType() %></p>

<p><b>Config Object:</b> JSP Page name = <%= config.getServletName() %></p>

<p><b>Page Object:</b> JSP class = <%= page.getClass().getName() %></p>

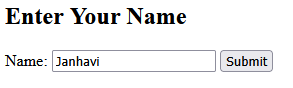
<p><b>PageContext Object:</b> Server info = <%= pageContext.getServletContext().getServerInfo() %></p>

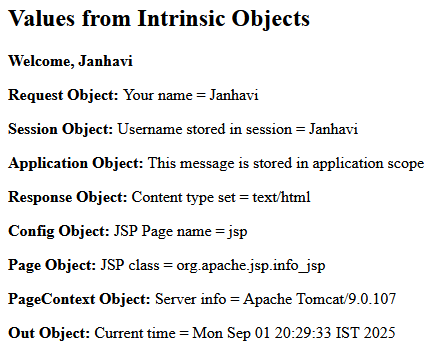
<p><b>Out Object:</b> Current time = <%= new Date() %></p>

</body>

</html>

**Output:**

****

****

**b. Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).**

**index.jsp**

<%@ page language="java" contentType="text/html; charset=UTF-8" %>

<!DOCTYPE html>

<html>

<head>

<title>User Form</title>

</head>

<body>

<h2>Enter Your Details</h2>

<form action="display.jsp" method="post">

Name: <input type="text" name="name"><br><br>

Age: <input type="text" name="age"><br><br>

Email: <input type="text" name="email"><br><br>

Gender:

<input type="radio" name="gender" value="Male"> Male

<input type="radio" name="gender" value="Female"> Female <br><br>

Hobbies:<br>

<input type="checkbox" name="hobbies" value="Reading"> Reading

<input type="checkbox" name="hobbies" value="Sports"> Sports

<input type="checkbox" name="hobbies" value="Music"> Music

<input type="checkbox" name="hobbies" value="Travel"> Travel

<br><br>

<input type="submit" value="Submit">

</form>

</body>

</html>

**display.jsp**

<%@ page language="java" contentType="text/html; charset=UTF-8" %>

<%@ page import="java.util.\*" %>

<!DOCTYPE html>

<html>

<head>

<title>Display Details</title>

</head>

<body>

<%

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

String ageStr = request.getParameter("age");

String email = request.getParameter("email");

String gender = request.getParameter("gender");

String[] hobbies = request.getParameterValues("hobbies");

boolean valid = true;

String errorMsg = "";

// Validation

if(name == null || name.trim().equals("")) {

valid = false;

errorMsg += "Name is required.<br>";

}

int age = 0;

try {

age = Integer.parseInt(ageStr);

if(age <= 0) {

valid = false;

errorMsg += "Age must be greater than 0.<br>";

}

} catch(Exception e) {

valid = false;

errorMsg += "Age must be a number.<br>";

}

if(email == null || !email.matches("^[A-Za-z0-9+\_.-]+@(.+)$")) {

valid = false;

errorMsg += "Invalid email format.<br>";

}

if(gender == null) {

valid = false;

errorMsg += "Please select gender.<br>";

}

if(hobbies == null || hobbies.length == 0) {

valid = false;

errorMsg += "Please select at least one hobby.<br>";

}

if(valid) {

%>

<h2>Details Entered</h2>

<b>Name:</b> <%= name %><br>

<b>Age:</b> <%= age %><br>

<b>Email:</b> <%= email %><br>

<b>Gender:</b> <%= gender %><br>

<b>Hobbies:</b>

<ul>

<% for(String h : hobbies) { %>

<li><%= h %></li>

<% } %>

</ul>

<%

} else {

%>

<h2 style="color:red;">Validation Errors</h2>

<%= errorMsg %>

<br><a href="index.jsp">Go Back</a>

<%

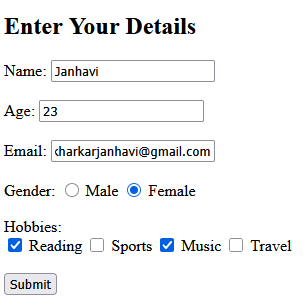
}

%>

</body>

</html>

**Output:**

****

****

**c. Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC.**

**Prerequisites:**

Create a database as follows:

CREATE DATABASE userdb;

USE userdb;

CREATE TABLE users (

id INT AUTO\_INCREMENT PRIMARY KEY,

username VARCHAR(50) UNIQUE NOT NULL,

password VARCHAR(100) NOT NULL

);

**dbconnect.jsp**

<%@ page import="java.sql.\*" %>

<%

String url = "jdbc:mysql://localhost:3306/userdb";

String user = "root"; // change as per your MySQL

String pass = "root"; // change as per your MySQL

Connection conn = null;

try {

Class.forName("com.mysql.cj.jdbc.Driver");

conn = DriverManager.getConnection(url, user, pass);

} catch(Exception e) {

out.println("Database connection error: " + e);

}

%>

**index.jsp**

<%

// If user already logged in, send to welcome page

if (session.getAttribute("username") != null) {

response.sendRedirect("welcome.jsp");

} else {

// Otherwise, send to login page

response.sendRedirect("register.jsp");

}

%>

**login.jsp**

<%@ include file="dbconnect.jsp" %>

<html>

<head><title>Login</title></head>

<body>

<h2>User Login</h2>

<form action="loginProcess.jsp" 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>

**loginProcess.jsp**

<%@ include file="dbconnect.jsp" %>

<%

String uname = request.getParameter("username");

String pwd = request.getParameter("password");

try {

PreparedStatement ps = conn.prepareStatement("SELECT \* FROM users WHERE username=? AND password=?");

ps.setString(1, uname);

ps.setString(2, pwd);

ResultSet rs = ps.executeQuery();

if(rs.next()){

session.setAttribute("username", uname);

response.sendRedirect("welcome.jsp");

} else {

out.println("<h3>Invalid username or password</h3>");

out.println("<a href='login.jsp'>Try Again</a>");

}

} catch(Exception e) {

out.println("Error: " + e.getMessage());

}

%>

**logout.jsp**

<%

session.invalidate();

response.sendRedirect("login.jsp");

%>

**register.jsp**

<%@ include file="dbconnect.jsp" %>

<html>

<head><title>Register</title></head>

<body>

<h2>User Registration</h2>

<form action="registerProcess.jsp" method="post">

Username: <input type="text" name="username" required><br><br>

Password: <input type="password" name="password" required><br><br>

<input type="submit" value="Register">

</form>

<p>Already registered? <a href="login.jsp">Login here</a></p>

</body>

</html>

**registerProcess.jsp**

<%@ include file="dbconnect.jsp" %>

<%

String uname = request.getParameter("username");

String pwd = request.getParameter("password");

try {

PreparedStatement ps = conn.prepareStatement("INSERT INTO users(username, password) VALUES (?, ?)");

ps.setString(1, uname);

ps.setString(2, pwd); // In real apps, hash the password

int i = ps.executeUpdate();

if(i > 0){

out.println("<h3>Registration successful!</h3>");

out.println("<a href='login.jsp'>Login Now</a>");

} else {

out.println("<h3>Registration failed. Try again.</h3>");

}

} catch(Exception e) {

out.println("Error: " + e.getMessage());

}

%>

**welcome.jsp**

<%

String user = (String)session.getAttribute("username");

if(user == null){

response.sendRedirect("login.jsp");

}

%>

<html>

<head><title>Welcome</title></head>

<body>

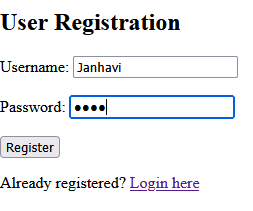
<h2>Welcome, <%= user %>!</h2>

<a href="logout.jsp">Logout</a>

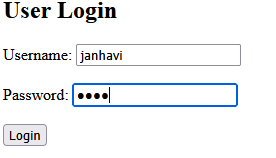
</body>

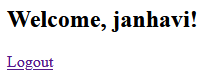
</html>

**Output:**

****

****

****

****

**PRACTICAL NO. 5**

**Implement the following JSP JSTL and EL Applications.**

**a. Create an html page with fields, eno, name, age, desg, salary. Now on submit this data to a JSP page which will update the employee table of database with matching eno.**

**Prerequisites:**

1.Add mysql connector jar file in project properties->libraries->Add jar file

2.Create a database as follows:

CREATE DATABASE yourDB;

USE yourDB;

CREATE TABLE employee (eno INT PRIMARY KEY,name VARCHAR(50),age INT,desg VARCHAR(50),salary DOUBLE);

**UpdateEmployee.jsp**

<%@ page import="java.sql.\*" %>

<%

// Fetch form data

String eno = request.getParameter("eno");

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

String age = request.getParameter("age");

String desg = request.getParameter("desg");

String salary = request.getParameter("salary");

Connection con = null;

PreparedStatement ps = null;

try {

// Load driver (example for MySQL)

Class.forName("com.mysql.cj.jdbc.Driver");

con = DriverManager.getConnection(

"jdbc:mysql://localhost:3306/yourDB", "root", "root");

// Update query

String query = "UPDATE employee SET name=?, age=?, desg=?, salary=? WHERE eno=?";

ps = con.prepareStatement(query);

ps.setString(1, name);

ps.setInt(2, Integer.parseInt(age));

ps.setString(3, desg);

ps.setDouble(4, Double.parseDouble(salary));

ps.setInt(5, Integer.parseInt(eno));

int i = ps.executeUpdate();

if (i > 0) {

out.println("<h3>Employee record updated successfully!</h3>");

} else {

out.println("<h3>No record found with Employee No: " + eno + "</h3>");

}

} catch (Exception e) {

out.println("<h3>Error: " + e.getMessage() + "</h3>");

} finally {

try { if (ps != null) ps.close(); } catch(Exception ex){}

try { if (con != null) con.close(); } catch(Exception ex){}

}

%>

**update.html**

<!DOCTYPE html>

<html>

<head>

<title>Update Employee</title>

</head>

<body>

<h2>Update Employee Details</h2>

<form action="UpdateEmployee.jsp" method="post">

<label for="eno">Employee No:</label>

<input type="text" id="eno" name="eno" required><br><br>

<label for="name">Employee Name:</label>

<input type="text" id="name" name="name" required><br><br>

<label for="age">Age:</label>

<input type="number" id="age" name="age" required><br><br>

<label for="desg">Designation:</label>

<input type="text" id="desg" name="desg" required><br><br>

<label for="salary">Salary:</label>

<input type="number" id="salary" name="salary" required><br><br>

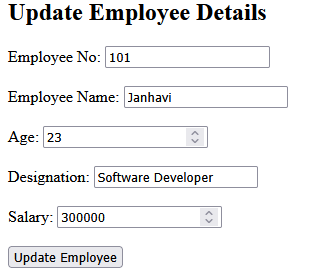
<input type="submit" value="Update Employee">

</form>

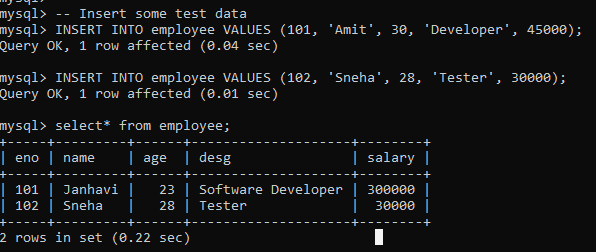
</body>

</html>

**Output:**

****

****

****

*Record before updation*

*Updated record*

**b. Create a JSP page to demonstrate the use of Expression language.**

**elDemo.jsp**

<%@ page contentType="text/html;charset=UTF-8" language="java" %>

<html>

<head>

<title>Expression Language Demo</title>

</head>

<body>

<h2>JSP Expression Language (EL) Example</h2>

<!-- Reading request parameter directly -->

<p>Hello, ${param.name}!</p>

<!-- Accessing request, session, and application attributes -->

<%

request.setAttribute("course", "Web Technology");

session.setAttribute("username", "JohnDoe");

application.setAttribute("college", "ABC Institute");

%>

<p>Course (from request scope): ${course}</p>

<p>Username (from session scope): ${username}</p>

<p>College (from application scope): ${college}</p>

<!-- Arithmetic operation using EL -->

<p>10 + 20 = ${10 + 20}</p>

<!-- Relational operator -->

<p>Is 100 greater than 50? ${100 gt 50}</p>

<!-- Conditional operator -->

<p>Welcome message: ${username == 'JohnDoe' ? 'Hello John!' : 'Hello Guest!'}</p>

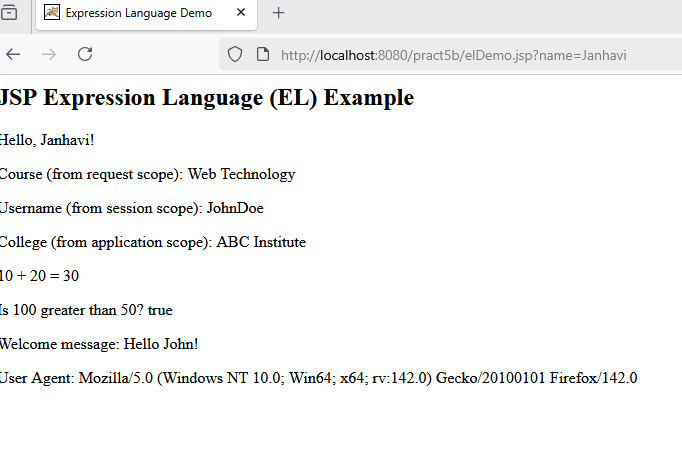
<!-- Accessing header -->

<p>User Agent: ${header["user-agent"]}</p>

</body>

</html>

**Output:**

****

*Type this URL as is(You can change the name to your name as well)*

**c. Create a JSP application to demonstrate the use of JSTL.**

**Prerequisites:**

*Download and add the jar file to your project - jstl-1.2*

**index.jsp**

<%@ page contentType="text/html; charset=UTF-8" %>

<html>

<head>

<title>JSTL Demo</title>

</head>

<body>

<h2>JSTL Demonstration</h2>

<form action="result.jsp" method="post">

Enter your name: <input type="text" name="username"/><br><br>

Enter a number: <input type="text" name="num"/><br><br>

<input type="submit" value="Submit"/>

</form>

</body>

</html>

**result.jsp**

<%@ page contentType="text/html; charset=UTF-8" %>

<%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>

<html>

<head>

<title>JSTL Result</title>

</head>

<body>

<h2>JSTL Example Output</h2>

<!-- Catch request parameters -->

<c:set var="user" value="${param.username}" />

<c:set var="number" value="${param.num}" />

<!-- If/Choose condition -->

<c:if test="${not empty user}">

<p>Hello, <b>${user}</b>!</p>

</c:if>

<c:choose>

<c:when test="${number % 2 == 0}">

<p>The number <b>${number}</b> is Even.</p>

</c:when>

<c:otherwise>

<p>The number <b>${number}</b> is Odd.</p>

</c:otherwise>

</c:choose>

<!-- Loop example -->

<h3>Numbers from 1 to ${number}:</h3>

<ul>

<c:forEach var="i" begin="1" end="${number}">

<li>${i}</li>

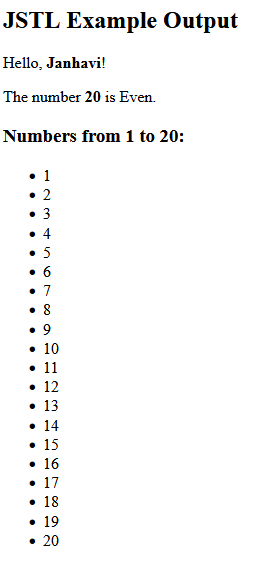
</c:forEach>

</ul>

</body>

</html>

**Output:**

****

**PRACTICAL NO. 6**

**Implement the following EJB Applications.**

**a. Create a Currency Converter application using EJB.**

**Prerequisites:**

Glassfish server

 Right-click project → **New → Session Bean**.

 Name: CurrencyConverterBean.

 Package: com.example.converter.

 Interface type: **Local**.

 Click Finish.

This will auto-generate:

* CurrencyConverterBean.java
* CurrencyConverterBeanLocal.java

**CurrencyConverterBeanLocal.java**

package com.example.converter;

import javax.ejb.Local;

import java.math.BigDecimal;

@Local

public interface CurrencyConverterBeanLocal {

BigDecimal convert(String sourceCurrency, String targetCurrency, BigDecimal amount);

}

**CurrencyConverterBean.java**

package com.example.converter;

import javax.ejb.Stateless;

import java.math.BigDecimal;

import java.math.RoundingMode;

import java.util.Map;

import java.util.HashMap;

@Stateless

public class CurrencyConverterBean implements CurrencyConverterBeanLocal {

private static final Map<String, BigDecimal> RATE\_TO\_USD = new HashMap<>();

static {

RATE\_TO\_USD.put("USD", BigDecimal.valueOf(1.0));

RATE\_TO\_USD.put("EUR", BigDecimal.valueOf(0.92));

RATE\_TO\_USD.put("INR", BigDecimal.valueOf(0.012));

RATE\_TO\_USD.put("GBP", BigDecimal.valueOf(1.21));

RATE\_TO\_USD.put("JPY", BigDecimal.valueOf(0.0064));

}

@Override

public BigDecimal convert(String sourceCurrency, String targetCurrency, BigDecimal amount) {

if (sourceCurrency == null || targetCurrency == null || amount == null) {

throw new IllegalArgumentException("Null arguments not allowed");

}

sourceCurrency = sourceCurrency.toUpperCase();

targetCurrency = targetCurrency.toUpperCase();

BigDecimal srcRate = RATE\_TO\_USD.get(sourceCurrency);

BigDecimal tgtRate = RATE\_TO\_USD.get(targetCurrency);

if (srcRate == null || tgtRate == null) {

throw new IllegalArgumentException("Unsupported currency code");

}

BigDecimal amountInUSD = amount.multiply(srcRate);

BigDecimal converted = amountInUSD.divide(tgtRate, 6, RoundingMode.HALF\_UP);

return converted.setScale(2, RoundingMode.HALF\_UP);

}

}

**ConverterServlet.java**

package com.example.converter;

import javax.ejb.EJB;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.\*;

import java.io.IOException;

import java.math.BigDecimal;

@WebServlet("/convert")

public class ConverterServlet extends HttpServlet {

@EJB

private CurrencyConverterBeanLocal converter;

@Override

protected void doPost(HttpServletRequest req, HttpServletResponse resp)

throws ServletException, IOException {

String from = req.getParameter("from");

String to = req.getParameter("to");

String amountStr = req.getParameter("amount");

String error = null;

BigDecimal result = null;

try {

BigDecimal amount = new BigDecimal(amountStr);

result = converter.convert(from, to, amount);

} catch (Exception e) {

error = "Conversion failed: " + e.getMessage();

}

req.setAttribute("from", from);

req.setAttribute("to", to);

req.setAttribute("amount", amountStr);

req.setAttribute("result", result);

req.setAttribute("error", error);

req.getRequestDispatcher("/result.jsp").forward(req, resp);

}

}

**index.jsp**

<%@ page contentType="text/html;charset=UTF-8" language="java" %>

<html>

<head><title>Simple Currency Converter (EJB)</title></head>

<body>

<h2>Currency Converter (Demo)</h2>

<form method="post" action="${pageContext.request.contextPath}/convert">

Amount: <input type="text" name="amount" value="100"/><br/><br/>

From:

<select name="from">

<option>USD</option>

<option>EUR</option>

<option>INR</option>

<option>GBP</option>

<option>JPY</option>

</select>

To:

<select name="to">

<option>INR</option>

<option>USD</option>

<option>EUR</option>

<option>GBP</option>

<option>JPY</option>

</select>

<br/><br/>

<button type="submit">Convert</button>

</form>

</body>

</html>

**result.jsp**

<%@ page contentType="text/html;charset=UTF-8" language="java" %>

<%@ taglib uri="http://java.sun.com/jsp/jstl/core" prefix="c" %>

<html>

<head><title>Result</title></head>

<body>

<h2>Conversion Result</h2>

<c:choose>

<c:when test="${not empty error}">

<p style="color:red;">${error}</p>

</c:when>

<c:otherwise>

<p>${amount} ${from} = <strong>${result} ${to}</strong></p>

</c:otherwise>

</c:choose>

<p><a href="${pageContext.request.contextPath}/index.jsp">Back</a></p>

</body>

</html>

**Note:**

While running the project if there is an error related server port is busy then run the following commands:

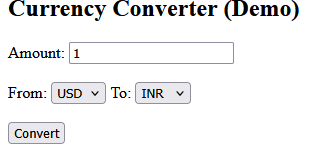
netstat -ano | findstr :8080

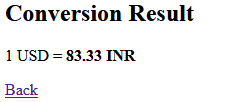
netstat -ano | findstr :8181

tasklist /FI "PID eq 3424"

taskkill /PID 3424 /F

**Output:**

****

****

**b. Develop a Simple Room Reservation System Application Using EJB.**

Create a package named ejb:create a session bean inside it as follows

**RoomReservationBean.java**

package ejb;

import javax.ejb.Stateless;

import java.util.HashMap;

import java.util.Map;

@Stateless

public class RoomReservationBean {

private static Map<Integer, String> rooms = new HashMap<>();

static {

rooms.put(101, "Available");

rooms.put(102, "Available");

rooms.put(103, "Available");

}

public String reserveRoom(int roomId) {

if (rooms.containsKey(roomId)) {

if (rooms.get(roomId).equals("Available")) {

rooms.put(roomId, "Reserved");

return "Room " + roomId + " reserved successfully!";

} else {

return "Room " + roomId + " is already reserved!";

}

} else {

return "Room not found!";

}

}

public String checkRoomStatus(int roomId) {

return rooms.getOrDefault(roomId, "Room not found!");

}

}

------ Create another package named web: create a servlet inside it

**ReservationServlet.java**

package web;

import ejb.RoomReservationBean;

import javax.ejb.EJB;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.\*;

import java.io.IOException;

import java.io.PrintWriter;

@WebServlet("/ReservationServlet")

public class ReservationServlet extends HttpServlet {

@EJB

private RoomReservationBean reservationBean;

@Override

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html");

PrintWriter out = response.getWriter();

String roomIdParam = request.getParameter("roomId");

if (roomIdParam != null) {

try {

int roomId = Integer.parseInt(roomIdParam);

String result = reservationBean.reserveRoom(roomId);

out.println("<h2>" + result + "</h2>");

} catch (NumberFormatException e) {

out.println("<h2>Invalid roomId format!</h2>");

}

} else {

out.println("<h2>Please provide a roomId parameter in URL</h2>");

}

}

}

**Note:** Make sure your **web**.**xml** looks like this :

<?xml version="1.0" encoding="UTF-8"?>

<web-app xmlns="http://xmlns.jcp.org/xml/ns/javaee"

xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"

xsi:schemaLocation="http://xmlns.jcp.org/xml/ns/javaee

http://xmlns.jcp.org/xml/ns/javaee/web-app\_3\_1.xsd"

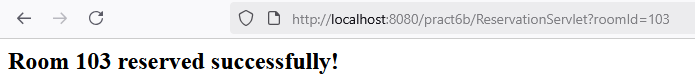
version="3.1">

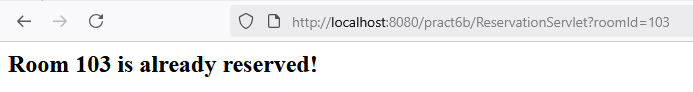
</web-app>

**Output:**

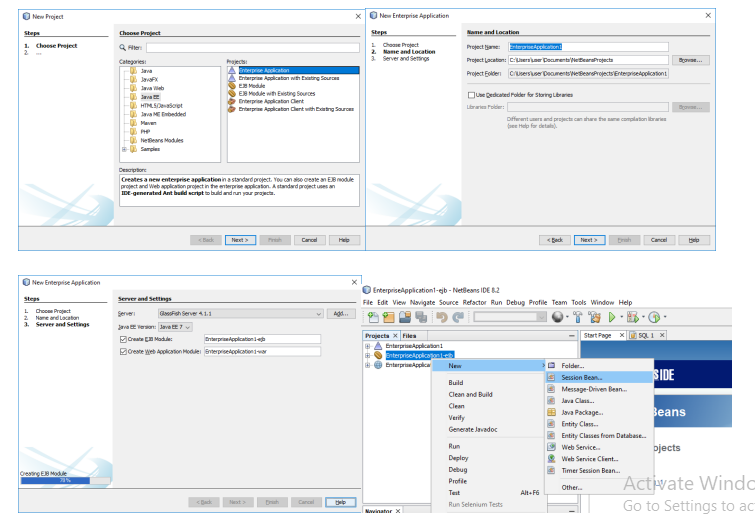
*In the browser change the url to http://localhost:8080/pract6b/ReservationServlet?roomId=103*

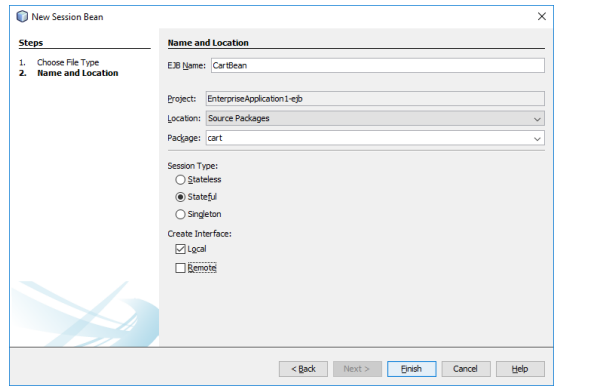
You can either select room no. 101 or 102 or 103

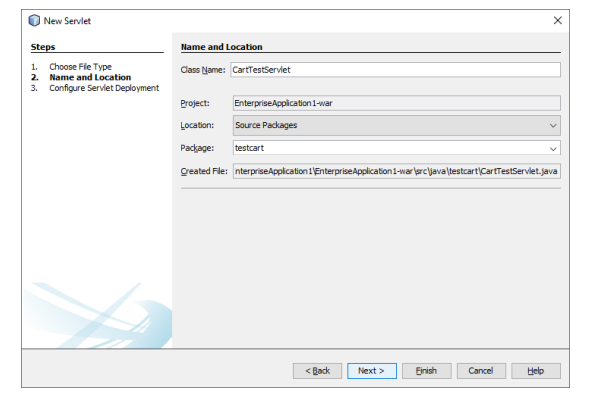


****

**c. Develop simple shopping cart application using EJB [Stateful Session Bean].**







**CartBean.java**

package cart;

import java.util.ArrayList;

import java.util.List;

import javax.ejb.Remove;

import javax.ejb.Stateful;

@Stateful

public class CartBean implements CartBeanLocal {

private String customerName;

private String customerId;

private List<String> contents = new ArrayList<>();

public void initialize(String person, String id) {

if (person == null) {

throw new IllegalArgumentException("Null person not allowed.");

} else {

customerName = person;

}

if ("ABC".equals(person) && "123".equals(id)) {

customerId = id;

} else {

throw new IllegalArgumentException("Invalid id: " + id);

}

}

public void addBook(String title) {

contents.add(title);

}

public void removeBook(String title) {

boolean result = contents.remove(title);

if (!result) {

throw new IllegalArgumentException(title + " not in cart.");

}

}

public List<String> getContents() {

return contents;

}

@Remove

public void remove() {

contents = null;

}

}

**CartBeanLocal.java**

package cart;

import java.util.List;

import javax.ejb.Local;

@Local

public interface CartBeanLocal {

void initialize(String person, String id);

void addBook(String title);

void removeBook(String title);

List<String> getContents();

void remove();

}

**CartTestServlet.java**

package testcart;

import cart.CartBeanLocal;

import java.io.IOException;

import java.io.PrintWriter;

import java.util.List;

import javax.ejb.EJB;

import javax.servlet.ServletException;

import javax.servlet.annotation.WebServlet;

import javax.servlet.http.HttpServlet;

import javax.servlet.http.HttpServletRequest;

import javax.servlet.http.HttpServletResponse;

@WebServlet(name = "CartTestServlet", urlPatterns = {"/CartTestServlet"})

public class CartTestServlet extends HttpServlet {

@EJB

private CartBeanLocal cartBean; // EJB injection

@Override

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html;charset=UTF-8");

try {

cartBean.initialize("ABC", "123");

cartBean.addBook("Java 8 Cookbook");

cartBean.addBook("Enterprise Java 7");

cartBean.addBook("Java for Dummies");

cartBean.addBook("Learn Java 8");

} catch (Exception e) {

e.printStackTrace();

}

try (PrintWriter out = response.getWriter()) {

try {

List<String> books = cartBean.getContents();

out.println("<h2>Books in Cart:</h2>");

for (String s : books) {

out.println(s + "<br/>");

}

} catch (Exception e) {

out.println("Error retrieving cart contents: " + e.getMessage());

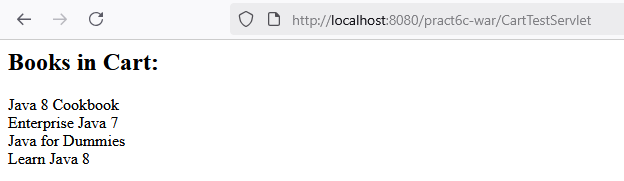
}

}

}

}

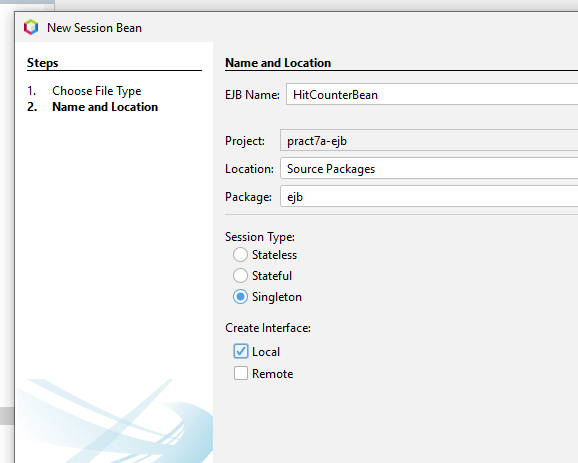
**Output:**



**PRACTICAL NO. 7**

**Implement the following EJB applications with different types of Beans.**

**a. Develop simple EJB application to demonstrate Servlet Hit count using Singleton Session Beans.**

****

**HitCounterBean.java**

package ejb;

import jakarta.ejb.Singleton;

@Singleton

public class HitCounterBean {

private int count = 0;

public int incrementAndGet() {

count++;

return count;

}

}

**HitCounterServlet.java**

package web;

import ejb.HitCounterBean;

import jakarta.ejb.EJB;

import jakarta.servlet.\*;

import jakarta.servlet.http.\*;

import java.io.IOException;

import java.io.PrintWriter;

public class HitCounterServlet extends HttpServlet {

@EJB

private HitCounterBean hitCounterBean;

@Override

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

response.setContentType("text/html");

PrintWriter out = response.getWriter();

int hits = hitCounterBean.incrementAndGet();

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

out.println("<h2>Servlet Hit Counter using Singleton EJB</h2>");

out.println("<p>This servlet has been accessed <b>" + hits + "</b> times.</p>");

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

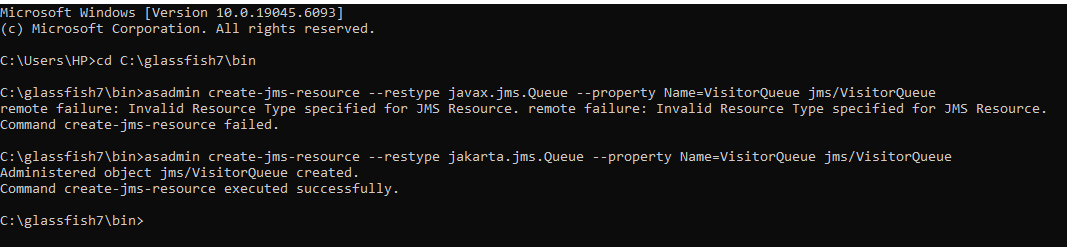
}

}

**Output:**

****

**b. Develop simple visitor Statistics application using Message Driven Bean [Stateless Session Bean].**

****

*C:\Users\HP>cd C:\glassfish7\bin*

*if the java version is java ee 7 then use this command :*

*C:\glassfish7\bin>asadmin create-jms-resource --restype javax.jms.Queue --property Name=VisitorQueue jms/VisitorQueue*

*if the java version is java ee 10 then use this command (in my case the version is java ee 10 that is why I used the following command):*

*C:\glassfish7\bin>asadmin create-jms-resource --restype jakarta.jms.Queue --property Name=VisitorQueue jms/VisitorQueue*

**VisitorMessageBean.java**

package ejb;

import jakarta.ejb.ActivationConfigProperty;

import jakarta.ejb.EJB; // ✅ Use @EJB for injecting EJBs

import jakarta.ejb.MessageDriven;

import jakarta.jms.Message;

import jakarta.jms.MessageListener;

@MessageDriven(

activationConfig = {

@ActivationConfigProperty(propertyName = "destinationLookup", propertyValue = "jms/VisitorQueue"),

@ActivationConfigProperty(propertyName = "destinationType", propertyValue = "jakarta.jms.Queue")

}

)

public class VisitorMessageBean implements MessageListener {

@EJB // ✅ Changed from @Inject to @EJB

private VisitorStatBean visitorStatBean;

@Override

public void onMessage(Message message) {

try {

System.out.println("Visitor Message Received!");

visitorStatBean.incrementVisitor();

} catch (Exception e) {

e.printStackTrace();

}

}

}

**VisitorStatBean.java**

package ejb;

import jakarta.ejb.Stateless;

@Stateless

public class VisitorStatBean {

private static int visitorCount = 0;

public void incrementVisitor() {

visitorCount++;

}

public int getVisitorCount() {

return visitorCount;

}

}

**VisitorServlet.java**

package web;

import ejb.VisitorStatBean;

import jakarta.annotation.Resource;

import jakarta.ejb.EJB; // ✅ Use this instead of Inject

import jakarta.jms.ConnectionFactory;

import jakarta.jms.JMSContext;

import jakarta.jms.Queue;

import jakarta.servlet.\*;

import jakarta.servlet.http.\*;

import java.io.IOException;

import java.io.PrintWriter;

public class VisitorServlet extends HttpServlet {

@Resource(lookup = "jms/VisitorQueue")

private Queue queue;

@Resource(lookup = "jms/\_\_defaultConnectionFactory")

private ConnectionFactory connectionFactory;

@EJB // ✅ Changed from @Inject to @EJB

private VisitorStatBean visitorStatBean;

@Override

protected void doGet(HttpServletRequest request, HttpServletResponse response)

throws ServletException, IOException {

// Send message to Queue

try (JMSContext context = connectionFactory.createContext()) {

context.createProducer().send(queue, "New Visitor");

}

// Show updated count

int count = visitorStatBean.getVisitorCount();

response.setContentType("text/html");

PrintWriter out = response.getWriter();

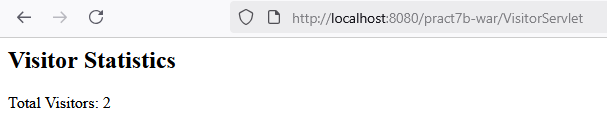
out.println("<h2>Visitor Statistics</h2>");

out.println("<p>Total Visitors: " + count + "</p>");

}

}

**Output:**

****

*Click to change the visitor count*

**PRACTICAL NO. 8**

**Implement the following JPA applications.**

**a. Develop a simple Inventory Application Using JPA.**

**Output:**

**b. Develop a Guestbook Application Using JPA.**

**Output:**

**c. Create simple JPA application to store and retrieve Book details.**

**Output:**

**PRACTICAL NO. 9**

**Implement the following JPA applications with ORM and Hibernate.**

**a. Develop a JPA Application to demonstrate use of ORM associations.**

**Output:**

**b. Develop a Hibernate application to store Feedback of Website Visitor in MySQL Database.**

**Output:**

**c. Develop a Hibernate application to store and retrieve employee details in MySQL Database.**

**Output:**

**PRACTICAL NO. 10**

**Implement the following Hibernate applications.**

**a. Develop an application to demonstrate Hibernate One- To -One Mapping Using Annotation.**

**Output:**

**b. Develop Hibernate application to enter and retrieve course details with ORM Mapping.**

**Output:**

**c. Develop a five page web application site using any two or three Java EE Technologies.**

**Output:**