UNIVERSITY MALAYSIA TERENGGANU
FACULTY OF COMPUTER SCIENCE & MATHEMATICS

**Web Based Application Development
CSM 3023**

LAB REPORT:
INRODUCTION TO SERVLET, JSP AND MYSQL
DATABASE

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**BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONORS
SEMESTER II 2023/2024**

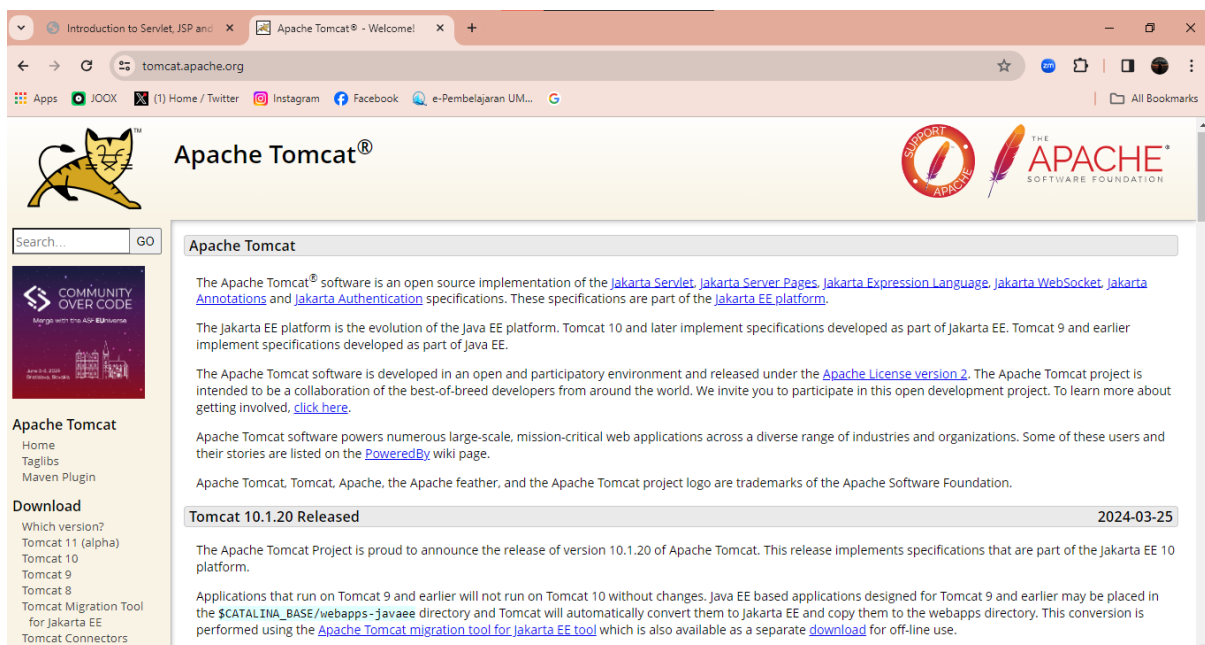## Task 1: Apache Tomcat and MySQL Installation Using XAMPP

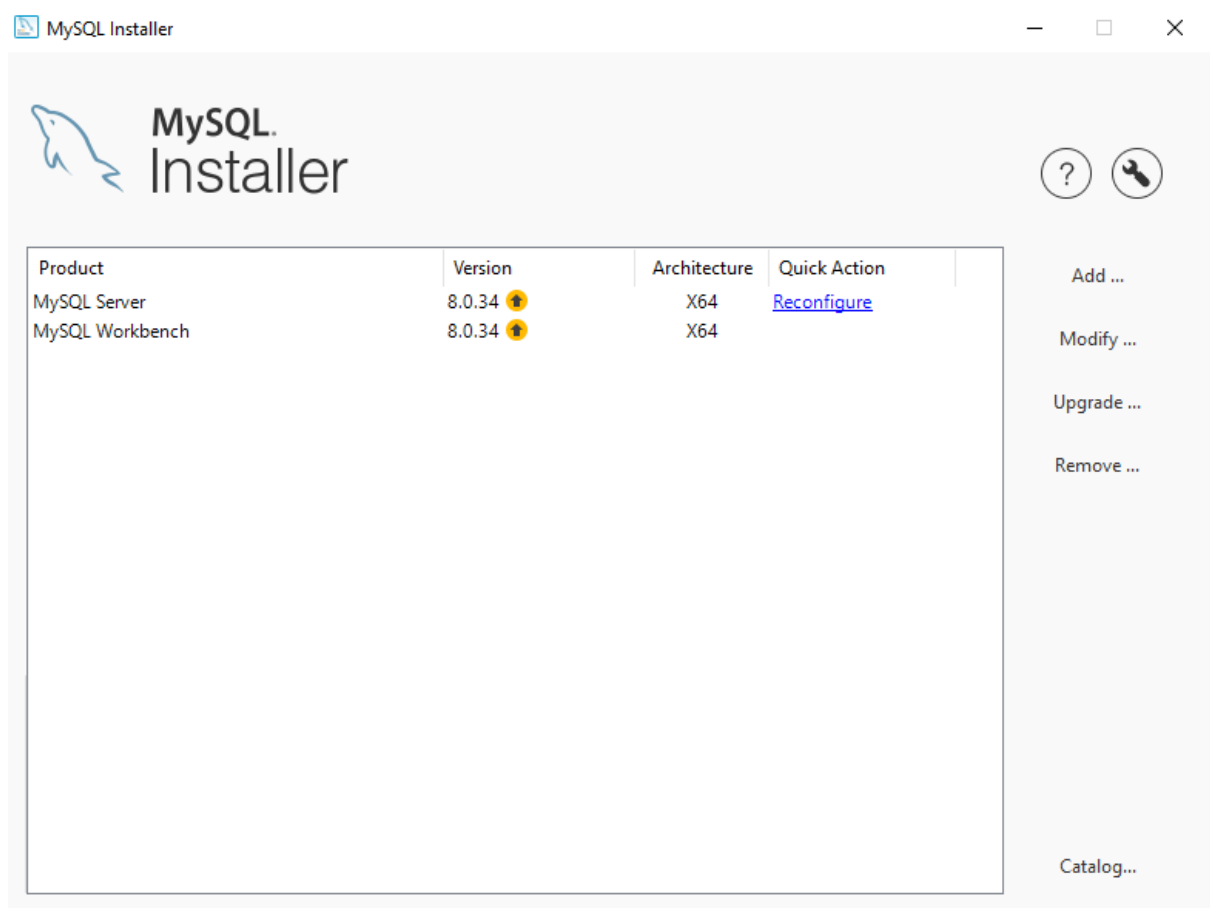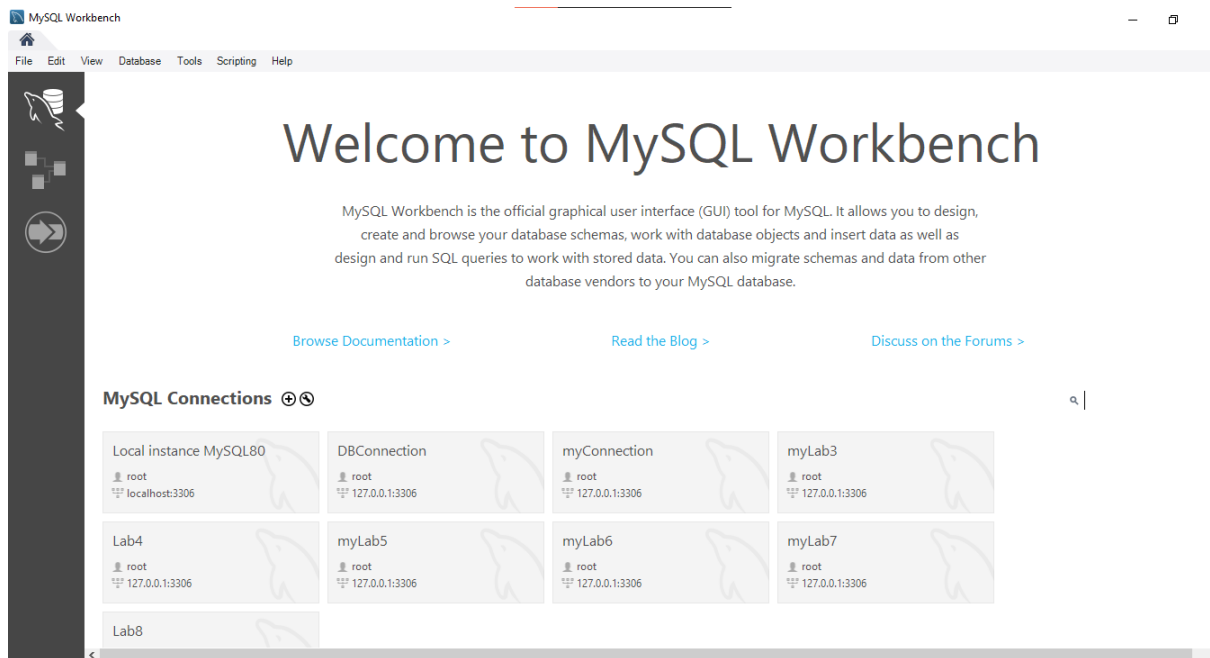|		
Objective	:	Installation of Apache Tomcat and MySQL
Problem Description	:	To install Apache Tomcat and MySQL
Estimated time	:	25 minutes

The Output :

For this task, I have learn about how to install the Apache Tomcat and MySQL on my laptop. The lecturer provide the lab manual how to install the software. It is an open-source software and easy to use.

Task 4: Netbeans 12.3 IDE Installation

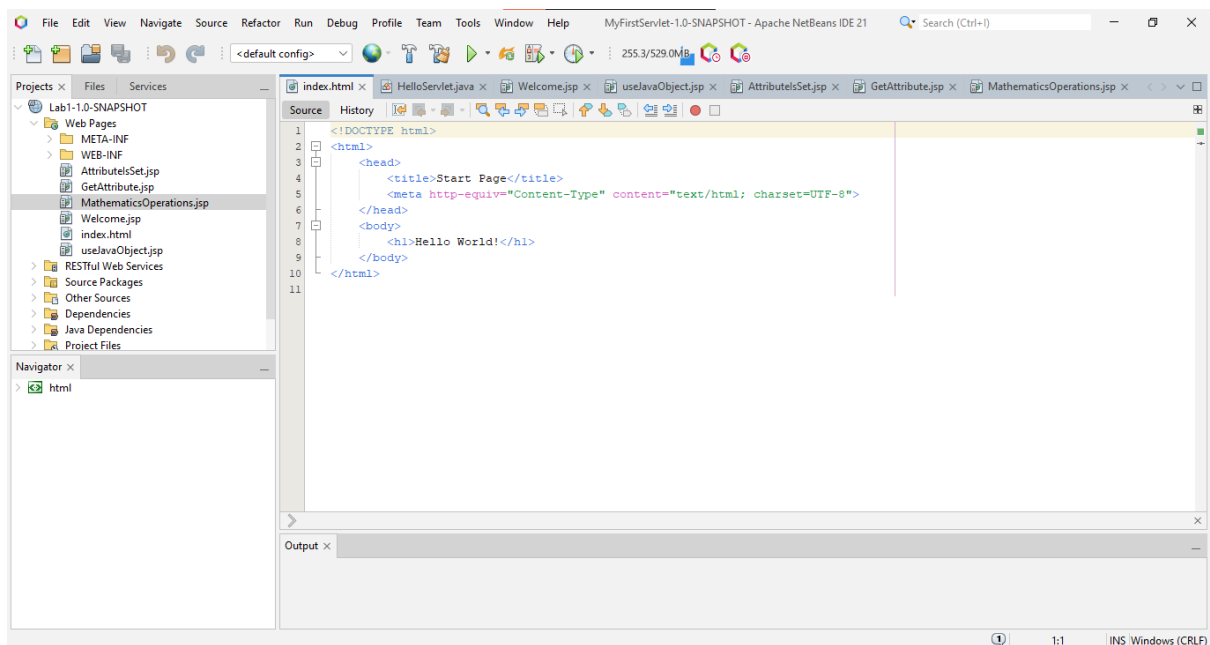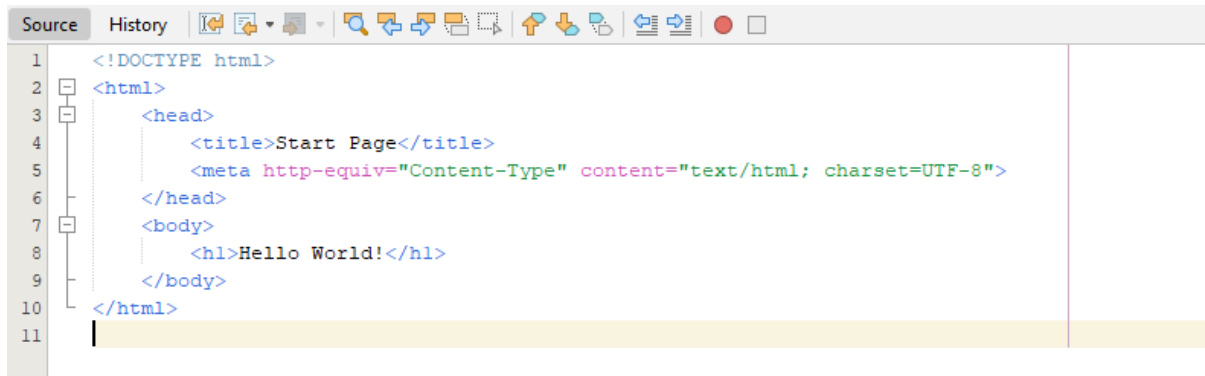|	
Objective:	Netbeans 21 IDE Installation
Problem Description:	To setup a proper environment for Java Web Application development.
Estimated time:	30 minutes

The Output :

The IDE I use are Netbeans version 21 for the installation.

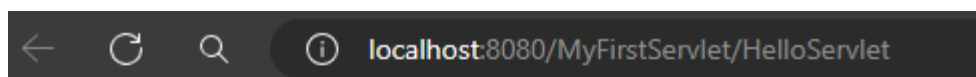## Task 5: Linking Netbeans to Apache Tomcat and Writing a Simple Java Servlet

Objective:	Link Netbeans to Apache Tomcat and Writing a Simple Java Servlet
Problem Description:	To write a simple Java Servlet
Estimated time:	15 minutes

The Code:

```
Source   History

1    <!DOCTYPE html>
2    <html>
3        <head>
4            <title>Start Page</title>
5            <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
6        </head>
7        <body>
8            <h1>Hello World!</h1>
9        </body>
10   </html>
11
```

The Output:

localhost:8080/MyFirstServlet/HelloServlet

Hello, Servlet!

Servlet HelloServlet at /MyFirstServlet

Reflections :

It is the same output as can be seen in **Step 18**: why?

Yes, the same output. It is because the method for processRequest() was called.
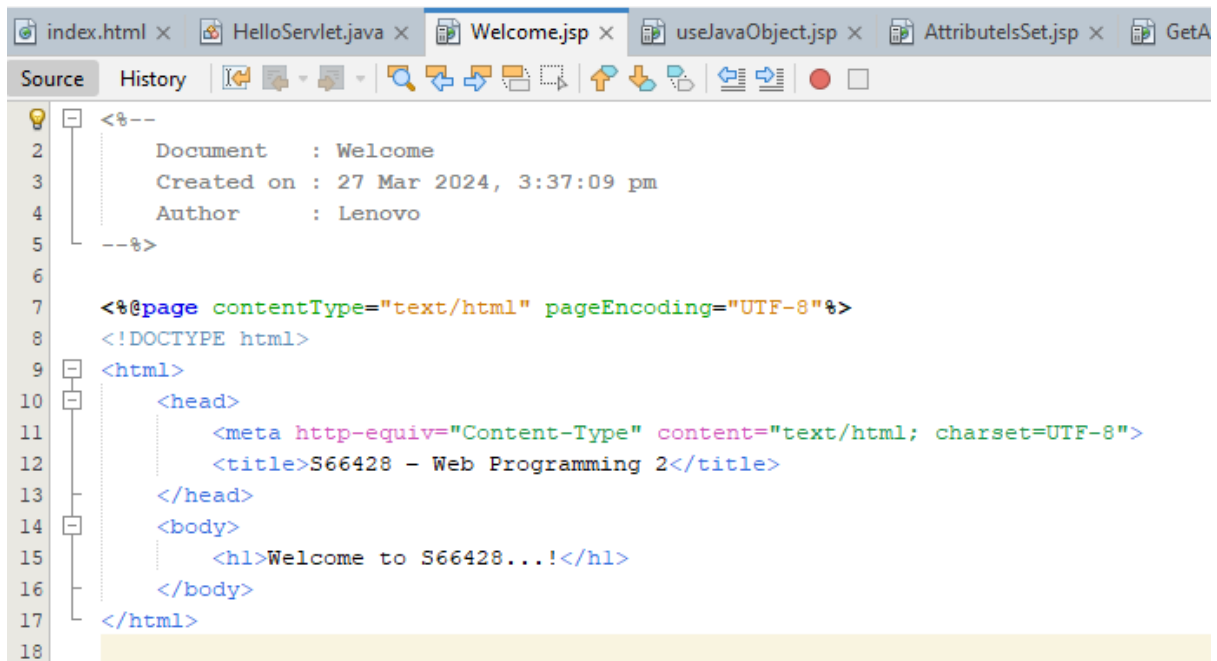
Task 6: Writing a Simple JSP Program

Objective : Writing a simple plain JSP program

Problem

Descriptio : Write a simple plain JSP program to display

"Welcome to [MATRICNUMBER]..!"

Estimated time : 15 minutes

The Code:

```jsp
<%--
    Document    : Welcome
    Created on  : 27 Mar 2024, 3:37:09 pm
    Author      : Lenovo
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>S66428 - Web Programming 2</title>
    </head>
    <body>
        <h1>Welcome to S66428...!</h1>
    </body>
</html>
```
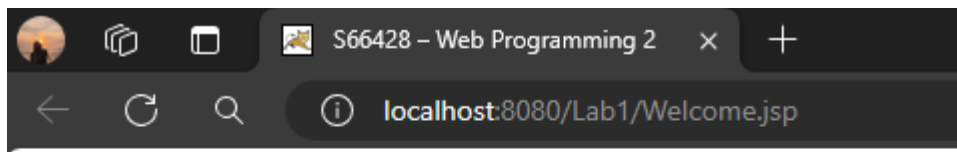
The Output:

The Questions :

1. What have you learned from this exercise?

   I have learnt about how to use JSP program in Netbeans using Apache Tomcat.

2. Explain the general concept of how the JSP's file work?

   JSP (JavaServer Pages) is server side technology to create dynamic java web application. JSP files are primarily HTML with embedded Java code. You can include HTML tags, CSS styles, JavaScript, and other web-related elements directly in the JSP file. This integration makes it easy to create interactive and visually appealing web pages.

3. Based on your observation of the previous tasks (Task 3 and Task 4), what are the differences you can find between servlet and JSP?

   Servlet and JSP have different functions on it.

Task 7: Use Java Reference Datatype/Class Wrapper in JSP

Objective	:	Using Java's object in JSP page.
Problem Descriptio	:	Display the current date, perform auto refresh header in JSP's page.
Estimated time	:	20 minutes

The Code:

```jsp
<%--
    Document    : useJavaObject
    Created on  : 27 Mar 2024, 3:49:21 pm
    Author      : Lenovo
--%>

<%@ page contentType="text/html; charset=UTF-8" %>
<%@ page import="java.util.Date" %>
<!DOCTYPE html>
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
<title>Using Java's object in JSP page</title>
</head>
<body>
<h1>Display Current Date and perform auto refresh header.</h1>
<%
Date todayDate = new Date();
out.print("<p>Current date and time is " + todayDate.toString() + "</p>");
// Set refresh, auto-load time in seconds
response.setIntHeader("Refresh", 5);
%>
</body>
</html>
```

Reflection

1. What have you learnt from this exercise?

   This exercise show how to use <% %> in the jsp.

2. What is Java Scriplet?
   Scriptlet is a piece of Java-code embedded in the HTML-like JSP code. The scriptlet is everything inside the <% %> tags. Between these the user can add any valid Scriptlet i.e. any valid Java Code.

3. How to use Java code in your JSP's page?
   Create a jsp page that contains the <%code fragment%> scriptlet. ·
   Keep any html tags in the page outside the scriptlet.

Task 8: Using JSP Implicit object in JSP page

Objective : Using JSP Implicit object (Session) in JSP

Problem Descriptio : Using Session object, perform simple Mathematics operations in JSP's page.

Estimated time : 30 minutes

The Code:

```jsp
<%--
    Document    : AttributeIsSet
    Created on  : 27 Mar 2024, 9:59:42 pm
    Author      : Lenovo
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Implicit JSP</title>
    </head>
    <body>
        <% session.setAttribute("user", "Arifah Hanafiah");%>
        <a href="GetAttrbute.jsp">Click here to get user name </a><!-- comment -->

        <br>
        <a href="MathematicsOperations.jsp">Result of mathematics opeartions</a>
    </body>
</html>
```

```jsp
<%--
    Document    : GetAttribute
    Created on  : 27 Mar 2024, 10:10:46 pm
    Author      : Lenovo
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page import="java.math.*"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Implicit JSP</title>
    </head>
    <body>
        <%
            String name = (String) session.getAttribute("user");
            out.println("User Name is: " + name);
        %>


    </body>
</html>
```

```jsp
<%--
    Document    : MathematicsOperations
    Created on  : 27 Mar 2024, 10:23:32 pm
    Author      : Lenovo
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title> MathematicsOperations Page</title>
    </head>
    <body>
        <%
            int num1 = 25;
            int num2 = 10;
            int addition_output;
            int multiply_output;
            double squareroot = 0.00;

            java.util.Formatter myFormat = new java.util.Formatter();

            //perform basic arithmetics operations,,,
            addition_output = num1 + num2;
            multiply_output = num1 * num2;

            //Find square root for variable num1...
            squareroot = (double)(Math.sqrt(num1));

            out.print("<p>Addition num1 and num2 is " + addition_output + "</p>");
            out.print("<p>Multiplication num1 and num2 is " + multiply_output + "</p>");

            out.print("<p></p>");
            out.print("<p>Square root of " + num1 + "is" + myFormat.format("%.2f",squareroot) + "</p>");
        %>

    </body>
</html>
```
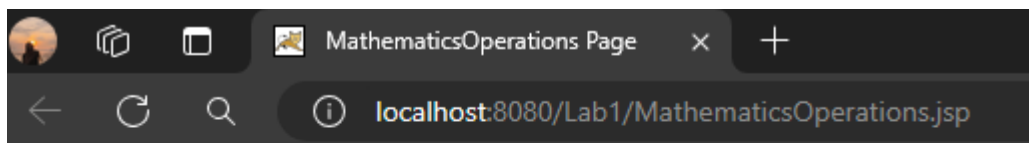
The Output:
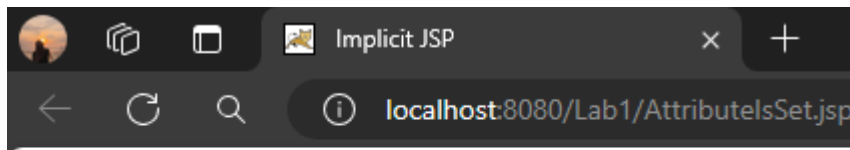
Click here to get user name
Result of mathematics opeartions
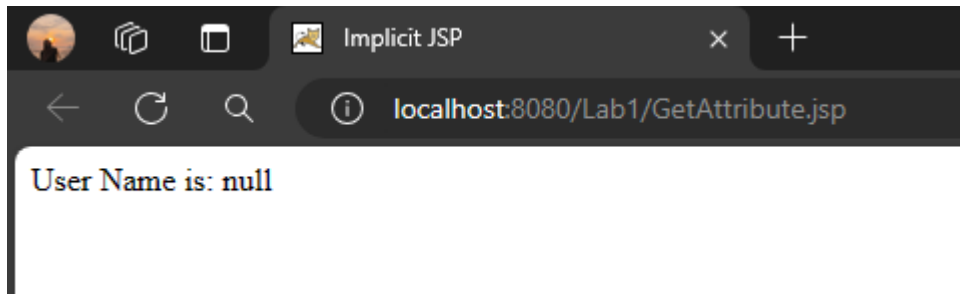
User Name is: null

Addition num1 and num2 is 35

Multiplication num1 and num2 is 250

Square root of 25is5.00

Reflection

1. How do you want to submit specific information from one form to next form?
   Using href. Href is the URL of the page that link with other pages.

2. What happened if the field name you specify in *request.getParameter ("field_name")* in the second page is different from the field name you defined in the first page?

   It shown "null"

Task 9: Populate Array values into HTML's Table

Objective	:	Read Java array and populate it into HTML's table.
Problem Descriptio	:	i. Create a 2D array that store sales data. ii. Then, read an array and populate into HTML's table.
Estimated time	:	50 minutes

The Code:

```
<%--
    Document    : populateArray
    Created on : 30 Mar 2024, 9:27:26 pm
    Author      : Lenovo
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Populate Array</title>
        <style>
            table, th, td {
                border: 1px solid black;
                border-collapse: collapse;
                padding: 8px 30px;
                text-align: center;
            }
            th{
                background-color: yellow;
            }
        </style>
    </head>
```
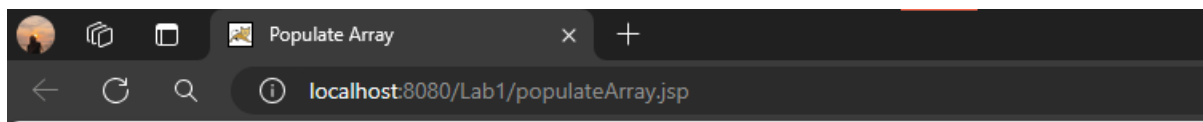
```
25  <body>
26      <h1>Read Java array and populate it into HTML's table</h1>
27      <%
28          String[][] sales = {
29              {"Salesman", "Jan", "Feb", "Mar"},
30              {"Salesman 1", "2500", "2100", "2200"},
31              {"Salesman 2", "2000", "2900", "2400"},
32              {"Salesman 3", "1800", "2200", "2450"}
33          };
34      %>
35      <table border="1">
36          <thead>
37              <tr>
38                  <% for (int j = 0; j < sales[0].length; j++) { %>
39                      <th><%= sales[0][j] %></th>
40                  <% } %>
41              </tr>
42          </thead>
43          <tbody>
44              <% for (int i = 1; i < sales.length; i++) { %>
45                  <tr>
46                      <% for (int j = 0; j < sales[i].length; j++) { %>
47                          <td><%= sales[i][j] %></td>
48                      <% } %>
49                  </tr>
50              <% } %>
51          </tbody>
52      </table>
53  </body>
54  </html>
55
```

The Output:

Read Java array and populate it into HTML's table

Salesman	Jan	Feb	Mar
Salesman 1	2500	2100	2200
Salesman 2	2000	2900	2400
Salesman 3	1800	2200	2450

Reflection

1. Write a sample syntax to declare 2D Java array.
   datatype[][] arrayname = new datatype [row][columns];

2. Define a sequence of steps on how you accomplish Task 7.
   - First: create new JSP file
   - Second: Write import java.util.Date
   - Third: Create date object and display current date and time
   - Fourth: Write setIntHeader()
   - Run

3. What is the difference between HTML's page and JSP's page?

   JSP provides a dynamic interface however HTML provides a means to give a detailed account of the structure of text-based information in a document. JSP generated dynamic web pages only. Whereas Html generated static web pages only.
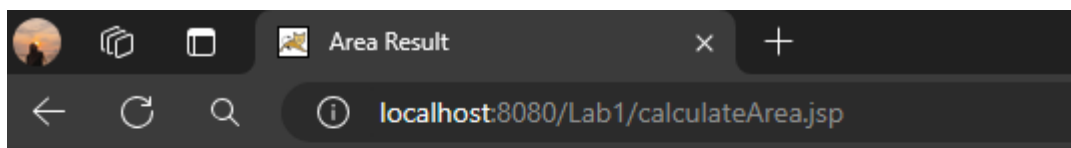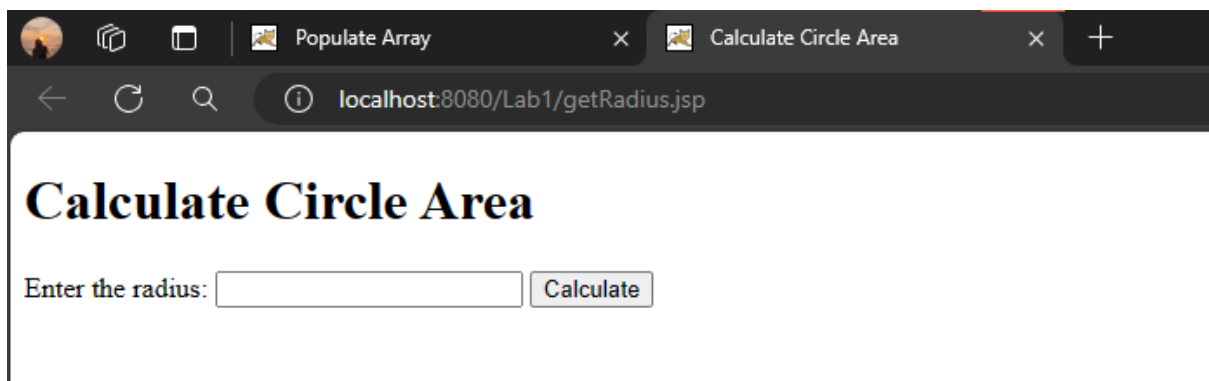
Exercise 1

The Code:

```jsp
<%--
    Document    : getRadius
    Created on  : 30 Mar 2024, 9:50:20 pm
    Author      : Lenovo
--%>

<%@ page language="java" contentType="text/html; charset=UTF-8"
    pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>Calculate Circle Area</title>
</head>
<body>
    <h1>Calculate Circle Area</h1>
    <form method="post" action="calculateArea.jsp">
        <label for="radius">Enter the radius:</label>
        <input type="text" id="radius" name="radius" pattern="[0-9]+" title="Please enter a number" required>
        <button type="submit">Calculate</button>
    </form>
</body>
</html>
```

```jsp
<%--
    Document    : calculateArea
    Created on  : 30 Mar 2024, 9:53:32 pm
    Author      : Lenovo
--%>

<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<%@ page import="java.text.DecimalFormat" %>
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<title>Area Result</title>
</head>
<body>
<h1>Area Result</h1>
<form action="calculateArea.jsp" method="post">
    Enter the radius of the circle: <input type="text" name="radius">
    <input type="submit" value="Calculate">
</form>

<%-- Retrieve the radius value from the form --%>
<% String radiusStr = request.getParameter("radius"); %>
<%-- Check if the radius value is provided and is a valid number --%>
<% if (radiusStr != null && radiusStr.matches("\\d+")) { %>
    <%-- Convert the radius string to an integer --%>
    <% int radius = Integer.parseInt(radiusStr); %>
    <%-- Calculate the area --%>
    <% double area = Math.PI * radius * radius; %>
    <%-- Format the area value --%>
    <% DecimalFormat df = new DecimalFormat("#.##"); %>
    <%-- Display the result --%>
    <p>The area of the circle with radius <%= radius %> is <%= df.format(area) %> square units.</p>
<% } else if (radiusStr != null && !radiusStr.isEmpty()) { %>
    <%-- Display an error message if the radius value is provided but not a valid number --%>
    <p>Please enter a valid number for the radius.</p>
<% } %>
</body>
</html>
umber --%>
```

The Output:

Calculate Circle Area

Enter the radius: [   ] [Calculate]

Area Result

Enter the radius of the circle: [   ] [Calculate]

The area of the circle with radius 10 is 314.16 square units.

Exercise 2

The Code:

```jsp
1  <%--
2      Document    : Sales.csv
3      Created on : 30 Mar 2024, 10:05:00 pm
4      Author      : Lenovo
5  --%>
6  <%@ page contentType="text/html; charset=UTF-8"%>
7  <%@ page import="java.io.*, java.util.*" %>
8  <!DOCTYPE html>
9  <html>
10 <head>
11 <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
12 <title>Sales csv File</title>
13 <style>
14 table, th, td {
15     border: 1px solid black;
16     border-collapse: collapse;
17     padding: 8px 30px;
18     text-align: center;
19 }
20 th {
21     background-color: lightgray;
22 }
23 </style>
24 </head>
```

```jsp
25    <body>
26      <h1>Read CSV files and populate it into HTML's table</h1>
27      <%
28      // Path to the CSV file (Update this path to the correct location)
29      String filePath = "D:/CSM3023/S66428/Lab1/sales.csv";
30      // List to hold the data from the CSV file
31      List<String[]> csvData = new ArrayList<>();
32      // Read the CSV file and populate the list
33      try (BufferedReader br = new BufferedReader(new FileReader(filePath))) {
34          String line;
35          while ((line = br.readLine()) != null) {
36              String[] parts = line.split(",");
37              csvData.add(parts);
38          }
39      } catch (IOException e) {
40          out.println("Error reading CSV file: " + e.getMessage());
41      }
42      %>
43      <table>
44      <thead>
45      <tr>
46      <th>Customer</th>
47      <th>Cust. Type</th>
48      <th>Purchase</th>
49      <th>Discount</th>
50      </tr>
51      </thead>
52      <tbody>
53      <% for (int i = 0; i < csvData.size(); i++) { %>
54      <tr>
55      <%
56      String[] rowData = csvData.get(i);
57      String customer = "";
58      String custType = "";
59      int purchase = 0;
60      double discount = 0.0;
61      if (rowData.length >= 3) { // Check if rowData has at least 3 elements
62          customer = rowData[0];
63          custType = rowData[1];
64          purchase = Integer.parseInt(rowData[2]);
65          if (custType.equalsIgnoreCase("Cash")) {
66              discount = purchase * 0.1; // 10% discount for cash customers
67          }
68      }
69      %>
70      <td><%= customer %></td>
71      <td><%= custType %></td>
72      <td><%= purchase %></td>
73      <td><%= String.format("%.2f", discount) %></td>
74      </tr>
75      <% } %>
76      </tbody>
77      </table>
78      </body>
79      </html>
80
81
```
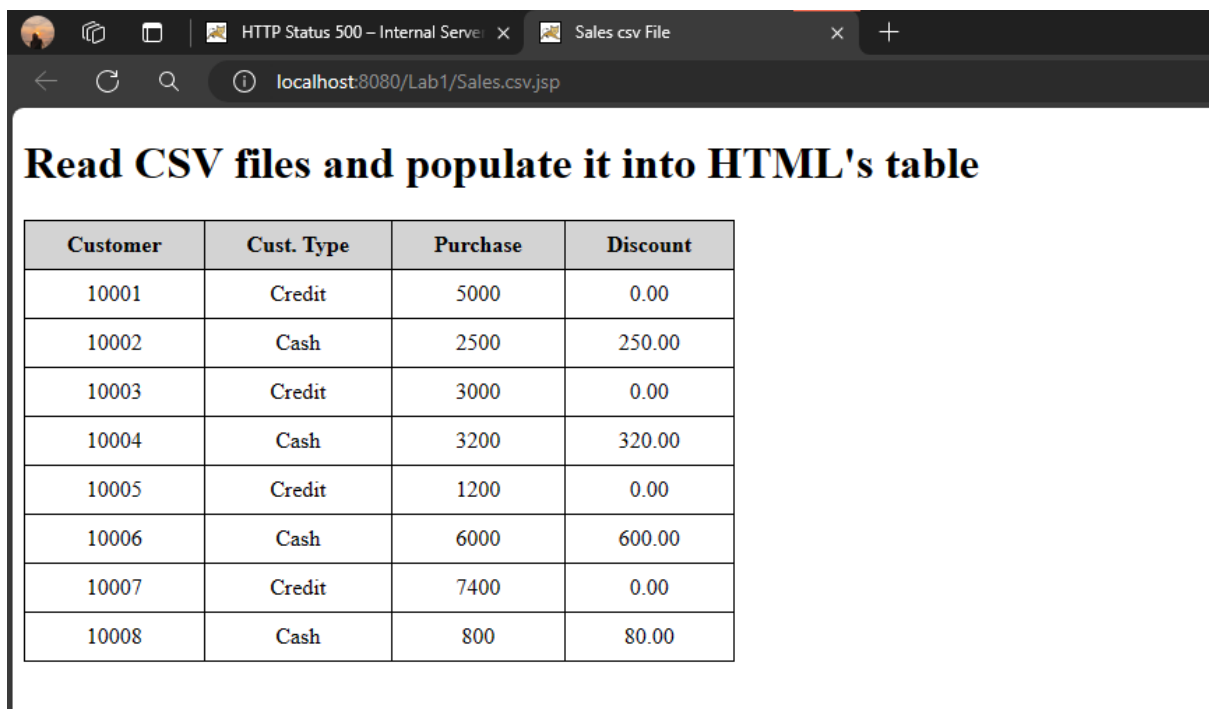
The Output:

Read CSV files and populate it into HTML's table

Customer	Cust. Type	Purchase	Discount
10001	Credit	5000	0.00
10002	Cash	2500	250.00
10003	Credit	3000	0.00
10004	Cash	3200	320.00
10005	Credit	1200	0.00
10006	Cash	6000	600.00
10007	Credit	7400	0.00
10008	Cash	800	80.00