UNIVERSITI MALAYSIA TERENGGANU

CSM3023 WEB BASED APPLICATION DEVELOPMENT

BACHELOR OF COMPUTER SCIENCE (MOBILE COMPUTING) WITH HONORS

LAB 01 - SERVLET

SEMESTER I 2023/2024

Prepared for:

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Task 5:Writing a Simple Java Servlet.

Objective: Writing a Simple Java Servlet
Problem Description: To write a simple Java Servlet

Coding:
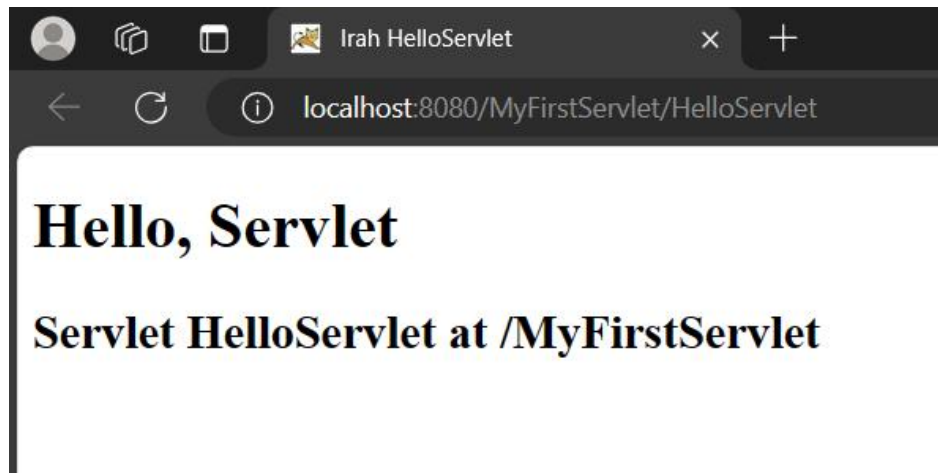
```java
package com.mycompany.myfirstservlet;

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

/**
 *
 * NUR ATIRAH BINTI SHAMSUDDIN, S67397
 */
public class HelloServlet extends HttpServlet {

    /**
     * Processes requests for both HTTP <code>GET</code> and <code>POST</code>
     * methods.
     *
     * @param request servlet request
     * @param response servlet response
     * @throws ServletException if a servlet-specific error occurs
     * @throws IOException if an I/O error occurs
     */
    protected void processRequest(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
        response.setContentType("text/html;charset=UTF-8");
        try (PrintWriter out = response.getWriter()) {
            /* TODO output your page here. You may use following sample code. */
            out.println("<!DOCTYPE html>");
            out.println("<html>");
            out.println("<head>");
            out.println("<title>Irah HelloServlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Hello, Servlet</h1>");
            out.println("<h2>Servlet HelloServlet at " + request.getContextPath() + "</h2>");
            out.println("</body>");
            out.println("</html>");
        }
    }

    HttpServlet methods. Click on the + sign on the left to edit the code.

}
```

Output:

Hello, Servlet

Servlet HelloServlet at /MyFirstServlet

Task 6: Writing a Simple JSP Program

Objective : Writing a simple plain JSP program
Problem Description : Write a simple plain JSP program to display
"Welcome to [MATRICNUMBER]..!"

Coding:


```jsp
<%--
    Document    : Welcome
    Created on  : 28 Mar 2024, 00:49:40
    Author      : Nur Atirah Binti Shamsuddin
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>S67397 - Web Programming 2</title>
    </head>
    <body>
        <h1>Welcome to S67397 page!</h1>
    </body>
</html>
```

Output:

Reflection

1. What have you learned from this exercise?
- I've learned how to create a simple JSP program. JSP seems to be same as HTML to me.

2. Explain the general concept of how the JSP's file work?
- JSP (JavaServer Pages) files are web pages that contain both HTML and Java code. When a user requests a JSP page, the web server executes the Java code and generates HTML dynamically, which is then sent to the user's web browser. This allows for dynamic content generation and interaction with databases or other backend systems within web applications.

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?
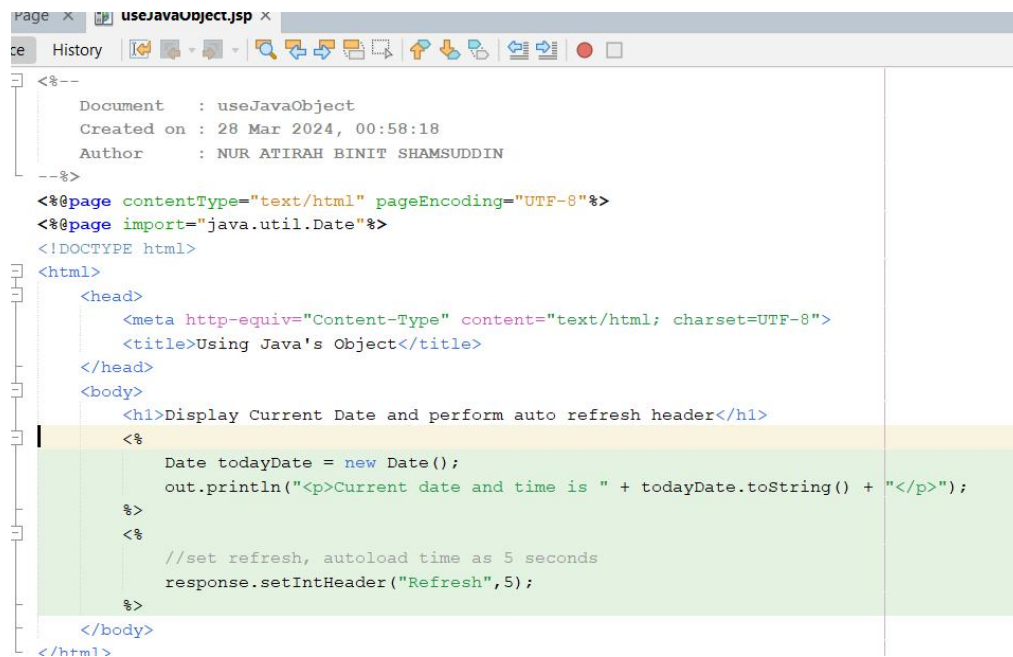
Aspect	Servlets	JSP (JavaServer Pages)
Purpose	Handle requests and responses on server side.	Generate dynamic content for web pages.
Syntax	Requires writing Java code to handle requests and responses.	Allows embedding Java code directly into HTML pages using special tags.

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

Objective : Using Java's object in JSP page.
Problem Description: Display the current date, perform auto refresh header in JSP's page.

Coding:

```jsp
<%--
    Document    : useJavaObject
    Created on  : 28 Mar 2024, 00:58:18
    Author      : NUR ATIRAH BINIT SHAMSUDDIN
--%>
<%@page contentType="text/html" pageEncoding="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</title>
    </head>
    <body>
        <h1>Display Current Date and perform auto refresh header</h1>
        <%
            Date todayDate = new Date();
            out.println("<p>Current date and time is " + todayDate.toString() + "</p>");
        %>
        <%
            //set refresh, autoload time as 5 seconds
            response.setIntHeader("Refresh",5);
        %>
    </body>
</html>
```

Output:

Display Current Date and perform auto refresh header

Current date and time is Sat Mar 30 21:16:43 MYT 2024

Reflection
1. What have you learnt from this exercise?
● JSP program can use Java's Object in its coding.

2. What is Java Scriplet?
● A Java Scriptlet is a block of Java code embedded within a JSP (JavaServer Pages) page. It is enclosed within <% %> tags and allows developers to include dynamic content and perform

server-side processing directly within the HTML structure of the JSP page. Scriptlets enable the integration of Java logic into web pages to generate dynamic content based on user inputs, database queries, or other business logic requirements.
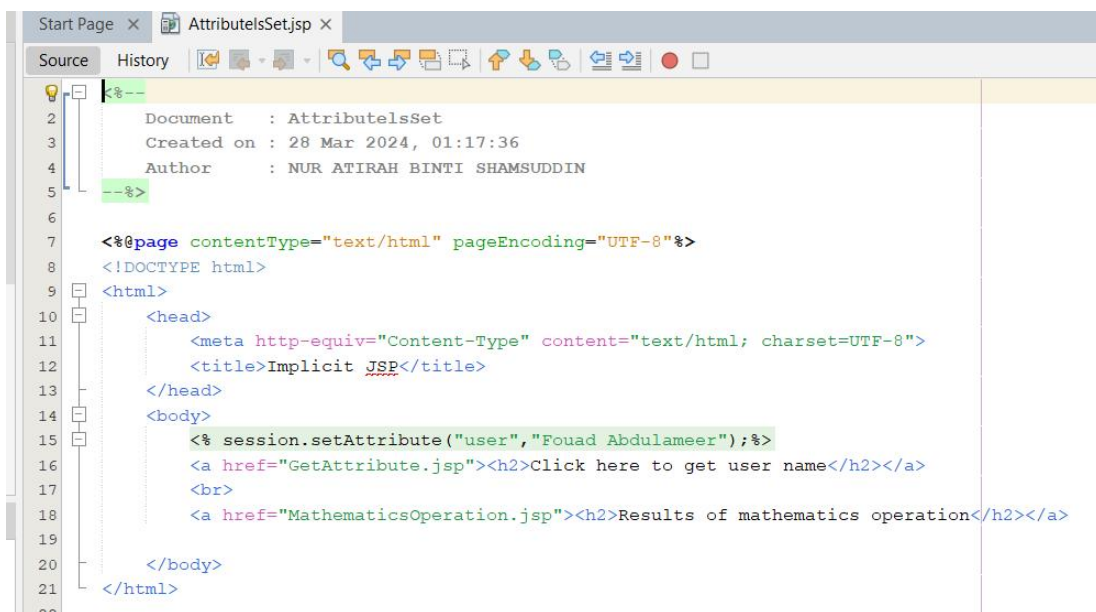
3. How to use Java code in your JSP's page?

● Use a method called toString() on the Date object todayDate.

Task 8: Using JSP Implicit object in JSP page

Objective : Using JSP Implicit object (Session) in JSP page.
Problem Description: Using Session object, perform simple Mathematics operations in JSP's page.

Coding:

```jsp
<%--
    Document    : AttributeIsSet
    Created on  : 28 Mar 2024, 01:17:36
    Author      : NUR ATIRAH BINTI SHAMSUDDIN
--%>

<%@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","Fouad Abdulameer");%>
        <a href="GetAttribute.jsp"><h2>Click here to get user name</h2></a>
        <br>
        <a href="MathematicsOperation.jsp"><h2>Results of mathematics operation</h2></a>

    </body>
</html>
```
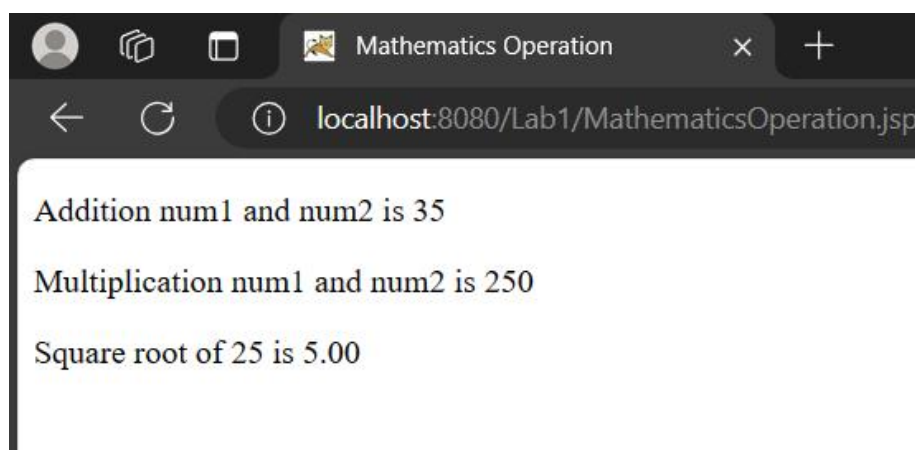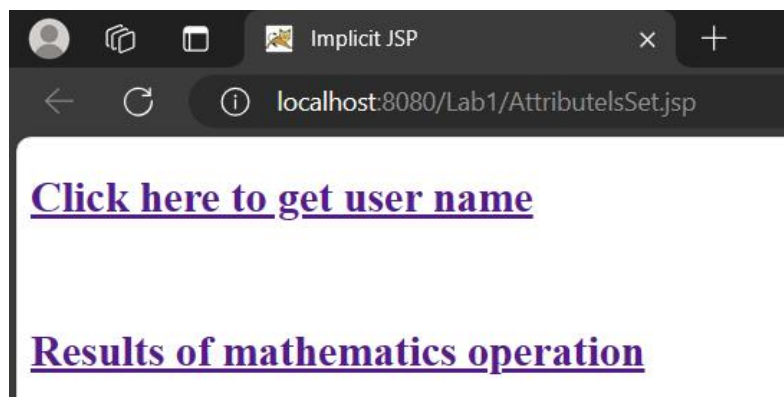
```jsp
<%--
    Document    : GetAttribute
    Created on : 28 Mar 2024, 01:24:17
    Author      : NUR ATIRAH BINTI SHAMSUDDIN
--%>

<%@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>
        <%
            String name = (String) session.getAttribute("user");
            out.println("User Name is "+name);
        %>
    </body>
</html>
```

```jsp
<%--
    Document    : MathematicsOperation
    Created on : 28 Mar 2024, 01:28:49
    Author      : NUR AATIRAH BT SHAMSUDDIN
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<%@page import="java.lang.Math" %>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Mathematics Operation</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();
```

```
24
25              //perform basic arithmetics operation
26              addition_output = num1 + num2;
27              multiply_output = num1 * num2;
28
29              //find square root for the varioable num1..
30              squareroot = (double) (Math.sqrt(num1));
31
32              out.print("<p>Addition num1 and num2 is "+addition_output+"</p>");
33              out.print("<p>Multiplication num1 and num2 is "+multiply_output+"</p>");
34
35              out.print("<p></p>");
36              out.print("<p>Square root of "+num1+" is "+myFormat.format("%.2f",squareroot)+"</p>");
37          %>
38      </body>
39  </html>
40
```

Output:

Implicit JSP

localhost:8080/Lab1/AttributeIsSet.jsp

Click here to get user name

Results of mathematics operation

implicit JSP

localhost:8080/Lab1/GetAttribute.jsp

User Name is Fouad Abdulameer

Mathematics Operation

localhost:8080/Lab1/MathematicsOperation.jsp

Addition num1 and num2 is 35

Multiplication num1 and num2 is 250

Square root of 25 is 5.00

Reflection

1. How do you want to submit specific information from one form to next form?

● By using session Attribute.

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?

● Won't be able to retrieve the parameter value using that field name.

Task 9: Populate Array values into HTML's Table

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

Coding:

```jsp
<%--
    Document   : populatedArray
    Created on : 28 Mar 2024, 01:45:14
    Author     : NUR ATIRAH BINTI SHAMSUDDIN
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Populated Array</title>
        <style>
            #salesmans{
                font-family:Arial, Helvetica, sans-serif ;
                border-collapse: collapse;
                width: 100%;
            }
            #salesmans td, #salesmans th{
                border: 1px solid black;
                padding: 8px;
            }
            #salesmans tr:nth-child(even){
                background-color: #f2f2f2;
            }
            #salesmans tr{
                padding-top: 12px;
                padding-bottom: 12px;
                text-align: center;
            }
            #salesmans th{
                background-color: #FFA753;
            }
            #salesmans td{
                background-color: #F8D8B9;
            }
        </style>
```
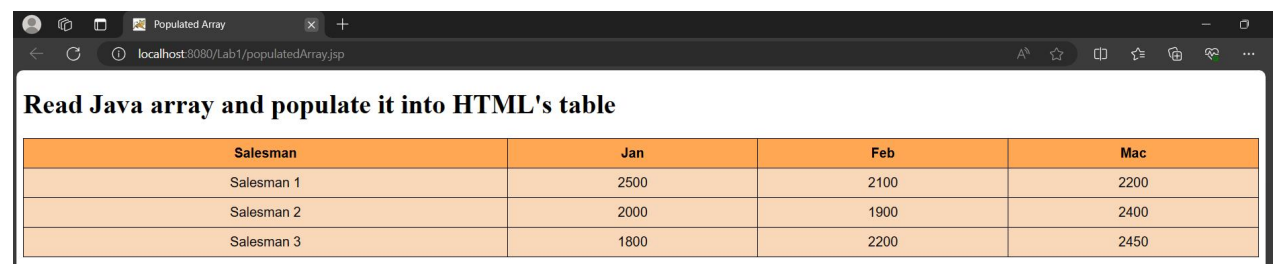
```
25
38   </head>
39   <body>
40       <h1>Read Java array and populate it into HTML's table</h1>
41       <table id="salesmans">
42           <tr>
43               <th>Salesman</th>
44               <th>Jan</th>
45               <th>Feb</th>
46               <th>Mac</th>
47           </tr>
48           <tr>
49               <td>Salesman 1</td>
50               <td>2500</td>
51               <td>2100</td>
52               <td>2200</td>
53           </tr>
54           <tr>
55               <td>Salesman 2</td>
56               <td>2000</td>
57               <td>1900</td>
58               <td>2400</td>
59           </tr>
60           <tr>
61               <td>Salesman 3</td>
62               <td>1800</td>
63               <td>2200</td>
64               <td>2450</td>
65           </tr>
66       </table>
67   </body>
68  </html>
69
```

Output:

Salesman	Jan	Feb	Mac
Salesman 1	2500	2100	2200
Salesman 2	2000	1900	2400
Salesman 3	1800	2200	2450

Read Java array and populate it into HTML's table

Reflection

1. Write a sample syntax to declare 2D Java array.
- dataType[][] arrayName = new dataType[rows][columns];

2. Define a sequence of steps on how you accomplish Task 7.
- By using table tag. <th></th> are to define the header of the table. <tr></tr> are to differentiate the row of the table. <td></td> are to input the record by row into the table.

3. What is the difference between HTML's page and JSP's page?
- HTML pages have fixed content that doesn't change unless manually updated, like a brochure. JSP pages mix regular HTML with smart Java code to create pages that can change their content dynamically, like a personalized greeting that changes based on who's visiting the site.

- HTML pages are processed directly by web browser. JSP pages are processed by a special server called a Java web server before being sent to browser. This allows JSP pages to do more complex things like connect to databases or perform calculations before showing user the page.

Exercise:

Exercise

1. The following program is developed using Java Standard Edition.

Input ✕

? Please enter the radius..!
10

OK   Cancel

Message ✕

ⓘ The area of circle = 314.0

OK
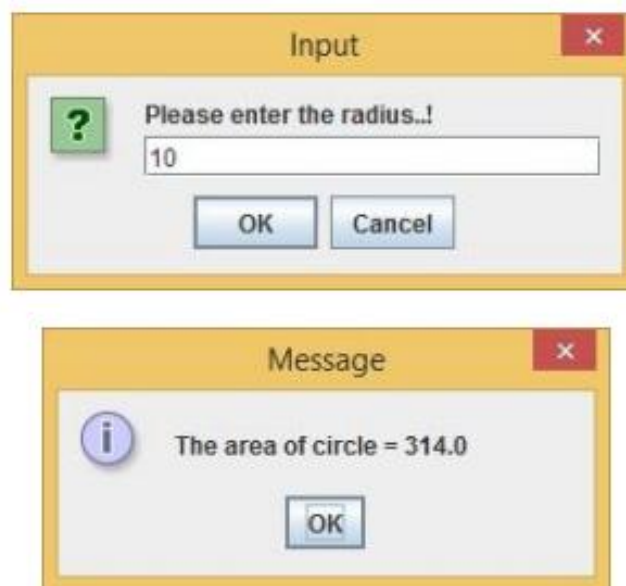
Convert this program into Web-Based application where the user can dynamically key-in radius and submit the request to get the area of a circle. You must ensure to accept only number as a radius.

Answer:

radius.jsp ×

Source | History

```jsp
<%--
    Document    : radius
    Created on : 30 Mar 2024, 14:26:04
    Author     : User
--%>

<%@page contentType="text/html" pageEncoding="UTF-8"%>
<!DOCTYPE html>
<html>
    <head>
        <meta http-equiv="Content-Type" content="text/html; charset=UTF-8">
        <title>Calculate Area</title>
    </head>
    <body>
        <h3>Please enter the radius...!</h3>
    <input id="radius">
    <button type="button" onclick="myFunction()">
        OK
    </button>
    <p id="demo"></p>
    <script>
        function myFunction(){
            var x, text;

            // get the value of the input field with id="radius"
            x = document.getElementById("radius").value;

            // if x is not a number
            if (isNaN(x)) {
                text = "Input not valid";
            } else {
                // calculate the area and round it to 2 decimal places
                var area = 3.14 * x * x;
                area = area.toFixed(1); // round to 2 decimal places
                text = "The area of circle = " + area;
            }
            document.getElementById("demo").innerHTML = text;
        }
    </script>
    </body>
</html>
```

Calculate Area

localhost:8080/Lab1/radius.jsp

Please enter the radius...!

12 OK

Please enter the radius...!

```
12              OK
```
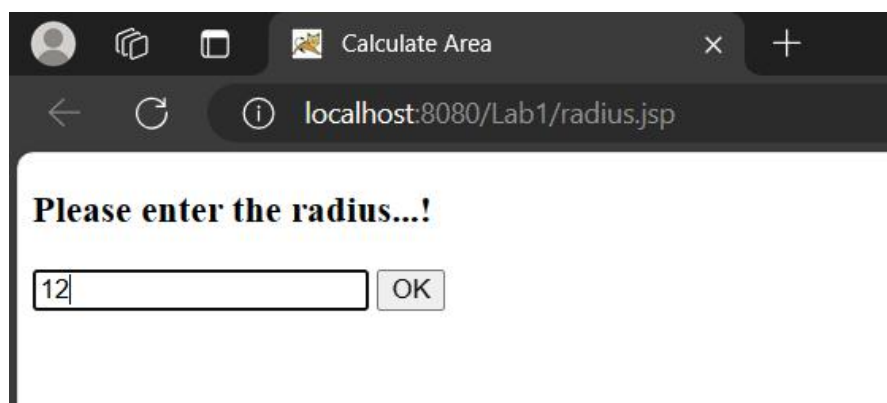
The area of circle = 452.2

2. Prepare the following file in the Notepad and save it as *Sales.csv*.

Sales.csv - Notepad

File   Edit   Format   View   Help

```
10001;Credit;5000.00
10002;Cash;2500.00
10003;Credit;3000.00
10004;Cash;3200.00
10005;Credit;1200.00
10006;Cash;6000.00
10007;Credit;7400.00
10008;Cash;800.00
```

Create a simple JSP's page to read Sales.csv file. Upon reading Sales.csv's file, calculate the discount and populate HTML's table in the JSP's page.

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

Cash customers are eligible to get a 10% discount.

Answer:

```jsp
                    // Ensure data array has 3 elements
                    if (data.length == 3) {
                        String customer = data[0];
                        String custType = data[1];
                        double purchase = Double.parseDouble(data[2]);
                        double discount = 0.0;

                        // Calculate discount for cash customers
                        if (custType.trim().equalsIgnoreCase("Cash")) {
                            discount = purchase * 0.1; // 10% discount for cash customers
                        }

                        // Display the data in the table
                        out.println("<tr>");
                        out.println("<td>" + customer + "</td>");
                        out.println("<td>" + custType + "</td>");
                        out.println("<td>" + purchase + "</td>");
                        out.println("<td>" + discount + "</td>");
                        out.println("</tr>");
                    } else {
                        // Handle case where data is not in the expected format
                        out.println("<tr><td colspan='4'>Invalid data format: " + line + "</td></tr>");
                    }
                }
                br.close();
            } catch (IOException e) {
                out.println("<tr><td colspan='4'>Error reading file: " + e.getMessage() + "</td></tr>");
            }
        %>
    </table>
</body>
</html>
```

```jsp
<%--
    Document    : Customer
    Created on  : 30 Mar 2024, 19:55:55
    Author      : NUR ATIRAH BINTI SHAMSUDDIN
--%>
<%@ page language="java" contentType="text/html; charset=UTF-8" pageEncoding="UTF-8"%>
<%@ page import="java.io.*, java.util.*" %>
<!DOCTYPE html>
<html>
<head>
    <meta charset="UTF-8">
    <title>Sales Data</title>
</head>
<body>
    <h1>Sales Data</h1>
    <table border="1">
        <tr>
            <th>Customer</th>
            <th>Cust. Type</th>
            <th>Purchase</th>
            <th>Discount</th>
        </tr>
        <%
            try {
                // Define the file path
                String filePath = "C:/Users/User/Desktop/csm3023 lab/S67397 Lab 1 - Servlet/Sales.csv";

                // Open the Sales.csv file
                BufferedReader br = new BufferedReader(new FileReader(filePath));
                String line;

                // Skip the header line
                br.readLine();

                // Read data line by line and display it in the table
                while ((line = br.readLine()) != null) {
                    String[] data = line.split(";");
```

Sales Data

Customer	Cust. Type	Purchase	Discount
10002	Cash	2500.0	250.0
10003	Credit	3000.0	0.0
10004	Cash	3200.0	320.0
10005	Credit	1200.0	0.0
10006	Cash	6000.0	600.0
10007	Credit	7400.0	0.0
10008	Cash	800.0	80.0