Assignment: Week 2 Servlets

Create a Java web application using servlets which take 2 numbers and the operation to be performed on them as input from users and display the result on the next page. The operations which can be performed are
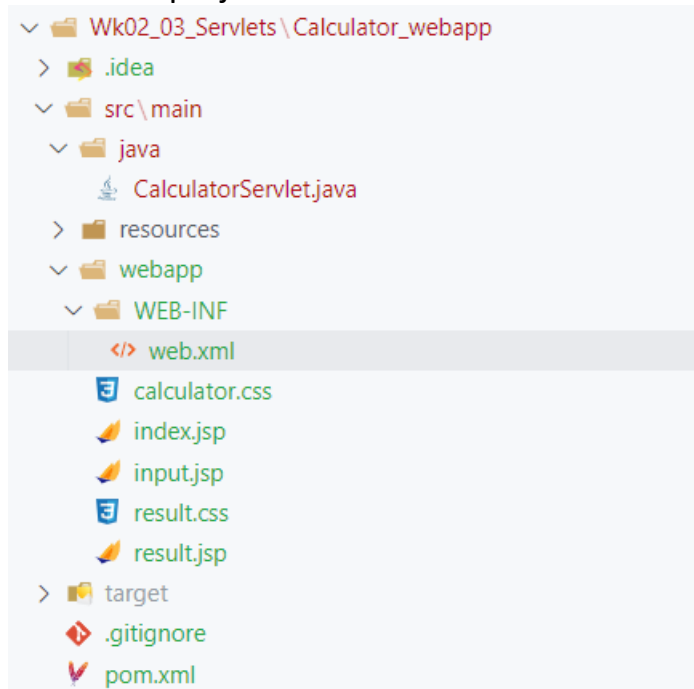
1. **Addition**
2. **Subtraction**
3. **Multiplication**
4. **Division**

Procedure:

1. Create a new maven project with **maven-archetype-webapp**
2. Add the following dependency to the **pom.xml**

```xml
<dependency>
    <groupId>jakarta.servlet</groupId>
    <artifactId>jakarta.servlet-api</artifactId>
    <version>6.0.0</version>
    <scope>provided</scope>
</dependency>
```

3. The project structure will be as follows:

```
∨ 📁 Wk02_03_Servlets\Calculator_webapp
  > 📁 .idea
  ∨ 📁 src\main
    ∨ 📁 java
        ☕ CalculatorServlet.java
    > 📁 resources
    ∨ 📁 webapp
      ∨ 📁 WEB-INF
          </> web.xml
        🎨 calculator.css
        📄 index.jsp
        📄 input.jsp
        🎨 result.css
        📄 result.jsp
  > 📁 target
    ◆ .gitignore
    V pom.xml
```

4. To the **CalculatorServlet.java**, add the following code-

```java
package Wk02_03_Servlets.Calculator_webapp.src.main.java;
import jakarta.servlet.ServletException;
import jakarta.servlet.annotation.WebServlet;
import jakarta.servlet.http.HttpServlet;
import jakarta.servlet.http.HttpServletRequest;
import jakarta.servlet.http.HttpServletResponse;

import java.io.IOException;

@WebServlet("/calculate")
public class CalculatorServlet extends HttpServlet {
    protected void doPost(HttpServletRequest request, HttpServletResponse response)
            throws ServletException, IOException {
```

```java
        int number1 = Integer.parseInt(request.getParameter("num1"));
        int number2 = Integer.parseInt(request.getParameter("num2"));
        String operation = request.getParameter("Operator");
        int result = 0;

        switch (operation) {
            case "+":
                result = number1 + number2;
                break;
            case "-":
                result = number1 - number2;
                break;
            case "*":
                result = number1 * number2;
                break;
            case "/":
                if (number2 != 0) {
                    result = number1 / number2;
                } else {
                    request.setAttribute("result", "Number cannot be divided by
zero");
                    request.getRequestDispatcher("result.jsp").forward(request,
response);
                    return;
                }
                break;
            default:
                request.setAttribute("result", "The operation is not valid!");
                request.getRequestDispatcher("result.jsp").forward(request, response);
                return;
        }

        request.setAttribute("result", result);
        request.getRequestDispatcher("result.jsp").forward(request, response);
    }
}
```

5. Add the following jsp files-

input.jsp

```html
<!DOCTYPE html>
<html>
<head>
    <title>Calculator</title>
    <link rel="stylesheet" type="text/css" href="calculator.css">
</head>
<body>
    <div class="container">
        <h2>Calculator</h2>
        <form action="calculate" method="post">
            Enter First Number: <input type="number" name="num1" required><br>
            Enter Second Number: <input type="number" name="num2" required><br>
            Select Operation:
            <select name="Operator" required>
```

```html
                <option value="+">Add</option>
                <option value="-">Subtract</option>
                <option value="*">Multiply</option>
                <option value="/">Divide</option>
            </select><br>
            <input type="submit" value="Calculate">
        </form>
    </div>
</body>
</html>
```

result.jsp

```html
<!DOCTYPE html>
<html>
<head>
    <title>Result</title>
    <link rel="stylesheet" type="text/css" href="result.css">
</head>
<body>
    <div class="container">
        <h2>Result</h2>
        <p class="result">The result is: <%= request.getAttribute("result") %></p>
    </div>
</body>
</html>
```

6. Add css for styling-

result.css

```css
body {
    font-family: Arial, sans-serif;
    background-color: #f4f4f4;
    margin: 0;
    padding: 0;
}

.container {
    width: 80%;
    margin: 0 auto;
    text-align: center;
}

h2 {
    color: #333;
}

.result {
    font-size: 24px;
    color: #008000;
}
```

calculator.css

```css
body {
    font-family: Arial, sans-serif;
    background-color: #f4f4f4;
    margin: 0;
    padding: 0;
}

.container {
    width: 50%;
    margin: 0 auto;
    text-align: center;
}

h2 {
    color: #333;
}

form {
    margin-top: 20px;
    padding: 20px;
    background-color: #fff;
    border-radius: 5px;
    box-shadow: 0 0 10px rgba(0, 0, 0, 0.1);
}

input[type="number"],
select {
    padding: 10px;
    width: 100%;
    margin-bottom: 10px;
    border: 1px solid #ccc;
    border-radius: 5px;
}

input[type="submit"] {
    background-color: #4CAF50;
    color: white;
    padding: 14px 20px;
    margin: 8px 0;
    border: none;
    border-radius: 5px;
    cursor: pointer;
}

input[type="submit"]:hover {
    background-color: #45a049;
}
```

7. Add the following to web.xml-

```xml
<?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_4_0.xsd"
         version="4.0">

  <servlet>
    <servlet-name>CalculatorServlet</servlet-name>
    <servlet-class>CalculatorServlet</servlet-class>
  </servlet>

  <servlet-mapping>
    <servlet-name>CalculatorServlet</servlet-name>
    <url-pattern>/calculate</url-pattern>
  </servlet-mapping>

  <welcome-file-list>
    <welcome-file>input.jsp</welcome-file>
  </welcome-file-list>
</web-app>
```

8. Run the project using the Tomcat Server-
http://localhost:8080/Calculator_webapp/

Calculator

Enter First Number:

55

Enter Second Number:

105

Select Operation:

Add

Calculate

http://localhost:8080/Calculator_webapp/calculate

Result

The result is: 160

Calculator

Enter First Number:

5500

Enter Second Number:

105

Select Operation:

Divide

Calculate

Result

The result is: 52