1. Create a Java Servlet (DisplayMessageServlet) that outputs a static message.

```java
import java.io.IOException;
import java.io.PrintWriter;
import javax.servlet.ServletException;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class DisplayMessageServlet extends HttpServlet {

    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>Servlet DisplayMessageServlet</title>");
            out.println("</head>");
            out.println("<body>");
            out.println("<h1>Welcome to the Java Servlet Lab!</h1>");
            out.println("</body>");
            out.println("</html>");
        }
    }
```

Code:

```java
6
7  import java.io.IOException;
8  import java.io.PrintWriter;
9  import javax.servlet.ServletException;
10 import javax.servlet.http.HttpServlet;
11 import javax.servlet.http.HttpServletRequest;
12 import javax.servlet.http.HttpServletResponse;
13
14 /**
15  *
16  * @author Dell
17  */
18 public class DisplayMessageServlet extends HttpServlet {
19
20
21     protected void processRequest(HttpServletRequest request, HttpServletResponse response)
22             throws ServletException, IOException {
23         response.setContentType("text/html;charset=UTF-8");
24         try (PrintWriter out = response.getWriter()) {
25             /* TODO output your page here. You may use following sample code. */
26             out.println("<!DOCTYPE html>");
27             out.println("<html>");
28             out.println("<head>");
29             out.println("<title>Servlet DisplayMessageServlet</title>");
30             out.println("</head>");
31             out.println("<body>");
32             out.println("<h1>Welcome to the Java Servlet Lab!</h1>");
33             out.println("</body>");
34             out.println("</html>");
35         }
36     }
37
38     // <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the + sign on the left to edit the code.">
39     /**
```

2. Deployment Descriptor (web.xml)

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

<web-app version="3.1" xmlns="http://xmlns.jcp.org/xml/ns/javaee" >

   <servlet>

      <servlet-name>DisplayMessageServlet</servlet-name>

      <servlet-class>DisplayMessageServlet</servlet-class>

   </servlet>

   <servlet-mapping>

      <servlet-name>DisplayMessageServlet</servlet-name>

      <url-pattern>/DisplayMessageServlet</url-pattern>

   </servlet-mapping>

   <session-config>

      <session-timeout>

         30

      </session-timeout>

   </session-config>

</web-app>
```
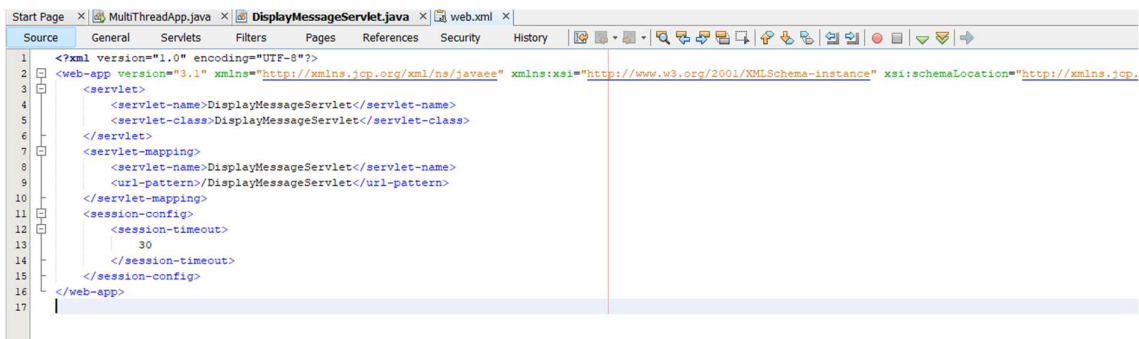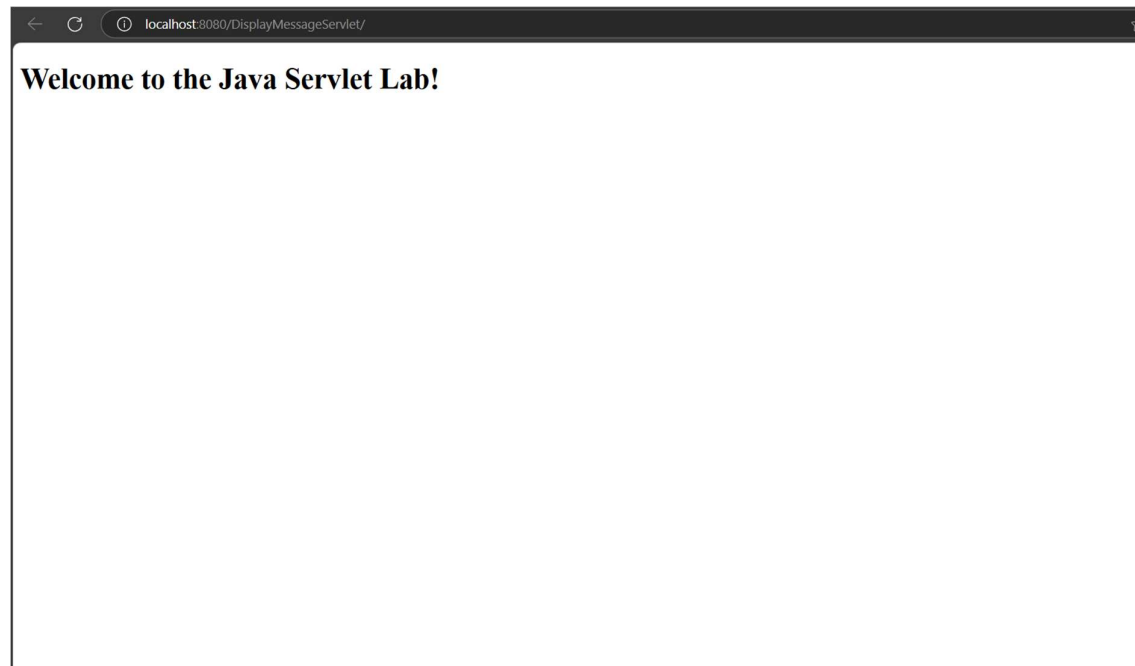
Code:

Output:

localhost:8080/DisplayMessageServlet/

Welcome to the Java Servlet Lab!

Lab Task 2: Get User Input from Form and Display

1. **Create an HTML form to collect the user's name.**

```
<!DOCTYPE html>
<html>
<head><title>Input Form</title></head>
<body>
<form action="getUserInput" method="POST">
Name: <input type="text" name="username" required><br>
<input type="submit" value="Submit">
</form>
</body>
</html>
```
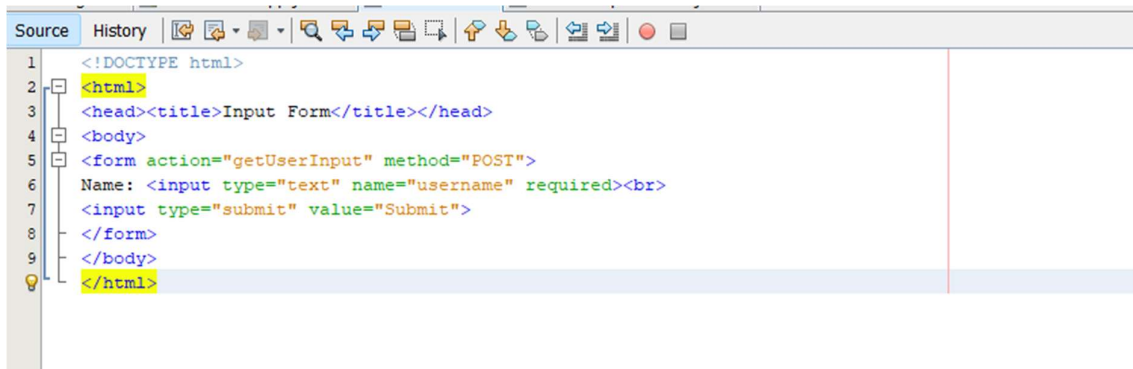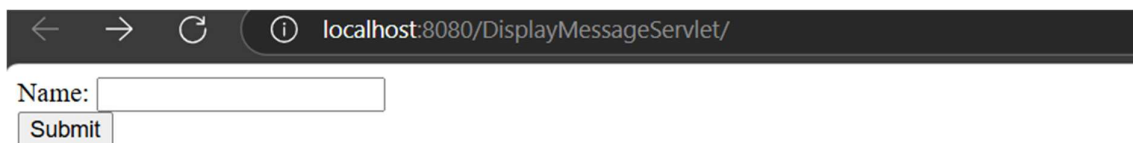
Code:

```
Source   History
1    <!DOCTYPE html>
2    <html>
3    <head><title>Input Form</title></head>
4    <body>
5    <form action="getUserInput" method="POST">
6    Name: <input type="text" name="username" required><br>
7    <input type="submit" value="Submit">
8    </form>
9    </body>
     </html>
```

Output:

localhost:8080/DisplayMessageServlet/

Name: [   ]
Submit

2. Create a Servlet (GetUserInputServlet) to handle the form submission and display the user's name.

```java
import java.io.IOException;

import java.io.PrintWriter;

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(urlPatterns = {"/getUserInput"})

public class GetUserInputServlet extends HttpServlet {


  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. */
      String username = request.getParameter("username");
      out.println("<!DOCTYPE html>");
      out.println("<html>");
      out.println("<head>");
      out.println("<title>Servlet GetUserInputServlet</title>");
      out.println("</head>");
      out.println("<body>");
      out.println("<h1>Hello, " + username + "!</h1>");
      out.println("</body>");
      out.println("</html>");
    }

  }
```

Code:

```
Start Page  ×  MultiThreadApp.java  ×  index.html  ×  GetUserInputServlet.java  ×
Source   History

1    /*
2     * To change this license header, choose License Headers in Project Properties.
3     * To change this template file, choose Tools | Templates
4     * and open the template in the editor.
5     */
6
7    import java.io.IOException;
8    import java.io.PrintWriter;
9    import javax.servlet.ServletException;
10   import javax.servlet.annotation.WebServlet;
11   import javax.servlet.http.HttpServlet;
12   import javax.servlet.http.HttpServletRequest;
13   import javax.servlet.http.HttpServletResponse;
14
15
16   @WebServlet(urlPatterns = {"/getUserInput"})
17   public class GetUserInputServlet extends HttpServlet {
18
19
20       protected void processRequest(HttpServletRequest request, HttpServletResponse response)
21               throws ServletException, IOException {
22           response.setContentType("text/html;charset=UTF-8");
23           try (PrintWriter out = response.getWriter()) {
24               /* TODO output your page here. You may use following sample code. */
25               String username = request.getParameter("username");
26               out.println("<!DOCTYPE html>");
27               out.println("<html>");
28               out.println("<head>");
29               out.println("<title>Servlet GetUserInputServlet</title>");
30               out.println("</head>");
31               out.println("<body>");
32               out.println("<h1>Hello, " + username + "!</h1>");
33               out.println("</body>");
34               out.println("</html>");
35           }
36       }
37
38       // <editor-fold defaultstate="collapsed" desc="HttpServlet methods. Click on the + sign on the left to edit the code.">
```

Output:

Hello, Adavi Gaweshaka!

Lab Task 3: Get Multiple Inputs, Perform Calculation, and Display Result

1. **Create an HTML form to take inputs for two numbers.**

```html
<!DOCTYPE html>
<html>
   <head><title>Sum Calculator</title></head>
   <body>
   <form action="calculateSum" method="POST">


     First Number: <input type="number" name="num1" required><br>
     Second Number: <input type="number" name="num2" required><br>
     <input type="submit" value="Calculate Sum">
   </form>
</body>
</html>
```
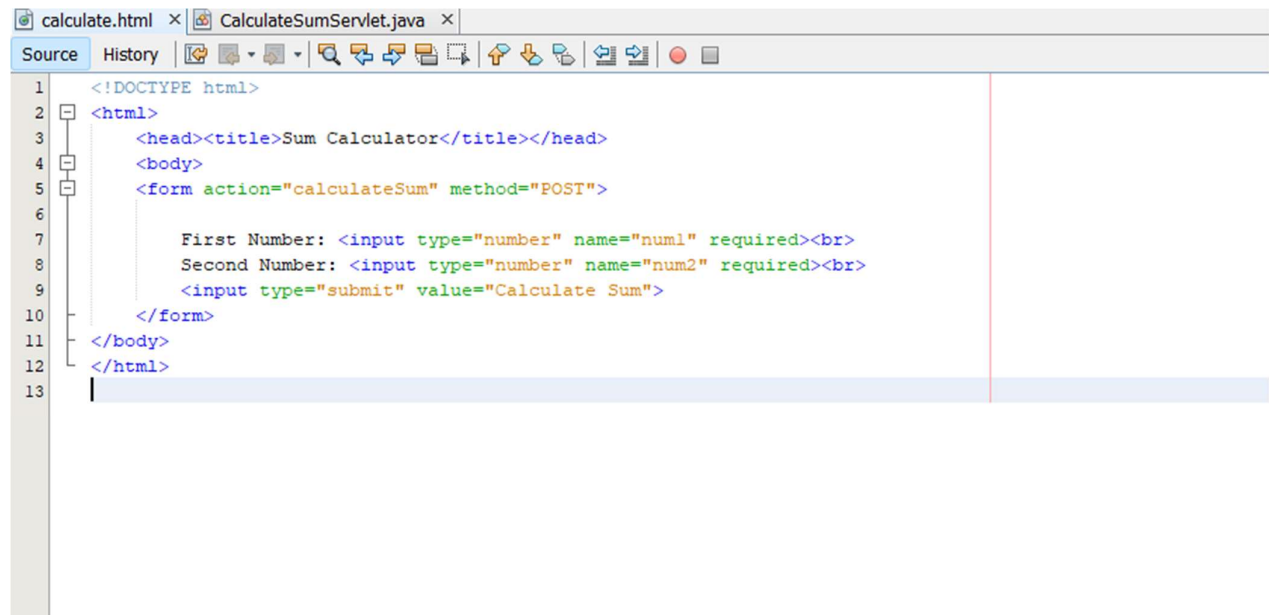
Code:

```html
calculate.html  ×   CalculateSumServlet.java  ×
Source  History
1    <!DOCTYPE html>
2    <html>
3        <head><title>Sum Calculator</title></head>
4        <body>
5        <form action="calculateSum" method="POST">
6
7            First Number: <input type="number" name="num1" required><br>
8            Second Number: <input type="number" name="num2" required><br>
9            <input type="submit" value="Calculate Sum">
10       </form>
11   </body>
12   </html>
13
```

Output:

localhost:8080/DisplayMessageServlet/calculate.html

First Number: 5
Second Number: 5
Calculate Sum

2. Create a Servlet (CalculateSumServlet) to calculate the sum of the numbers and display the result.

```java
import java.io.IOException;

import java.io.PrintWriter;

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(urlPatterns = {"/calculateSum"})
public class CalculateSumServlet extends HttpServlet {

  protected void processRequest(HttpServletRequest request, HttpServletResponse response)
      throws ServletException, IOException {
    response.setContentType("text/html;charset=UTF-8");
    try (PrintWriter out = response.getWriter()) {
      int num1 = Integer.parseInt(request.getParameter("num1"));
      int num2 = Integer.parseInt(request.getParameter("num2"));
      int sum = num1 + num2;

      out.println("<!DOCTYPE html>");
      out.println("<html>");
      out.println("<head>");
      out.println("<title>Servlet CalculateSumServlet</title>");
      out.println("</head>");
      out.println("<body>");
      out.println("<html><body>");
      out.println("<h1>The sum of " + num1 + " and " + num2 + " is: " + sum + "</h1>");
      out.println("</body>");
      out.println("</html>");
    }
```

Code:

```
     */

7   import java.io.IOException;
8   import java.io.PrintWriter;
9   import javax.servlet.ServletException;
10  import javax.servlet.annotation.WebServlet;
11  import javax.servlet.http.HttpServlet;
12  import javax.servlet.http.HttpServletRequest;
13  import javax.servlet.http.HttpServletResponse;

15  @WebServlet(urlPatterns = {"/calculateSum"})
16  public class CalculateSumServlet extends HttpServlet {


19      protected void processRequest(HttpServletRequest request, HttpServletResponse response)
20              throws ServletException, IOException {
21          response.setContentType("text/html;charset=UTF-8");
22          try (PrintWriter out = response.getWriter()) {
23              /* TODO output your page here. You may use following sample code. */

25              int num1 = Integer.parseInt(request.getParameter("num1"));
26              int num2 = Integer.parseInt(request.getParameter("num2"));
27              int sum = num1 + num2;


30              out.println("<!DOCTYPE html>");
31              out.println("<html>");
32              out.println("<head>");
33              out.println("<title>Servlet CalculateSumServlet</title>");
34              out.println("</head>");
35              out.println("<body>");
36              out.println("<html><body>");
37              out.println("<h1>The sum of " + num1 + " and " + num2 + " is: " + sum + "</h1>");
38              out.println("</body>");
39              out.println("</html>");
40          }
41      }
42  }
```

Output:

localhost:8080/DisplayMessageServlet/calculateSum

The sum of 5 and 5 is: 10