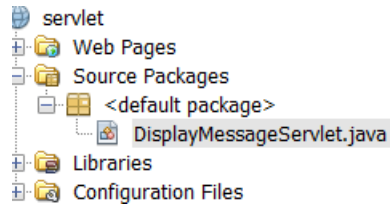Java Servlet

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

```
servlet
├─ Web Pages
├─ Source Packages
│   └─ <default package>
│       └─ DisplayMessageServlet.java
├─ Libraries
└─ Configuration Files
```

2: Configure the servlet using the @WebServlet annotation or the web.xml deployment descriptor.

```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("/displayMessage")

public class DisplayMessageServlet extends HttpServlet {

    protected void doGet(HttpServletRequest request, HttpServletResponse  response)

    throws ServletException, IOException {

        response.setContentType("text/html");

        PrintWriter out = response.getWriter();

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

            out.println("<h1>Welcome to the Java Servlet Lab!</h1>");

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

    }

}
```
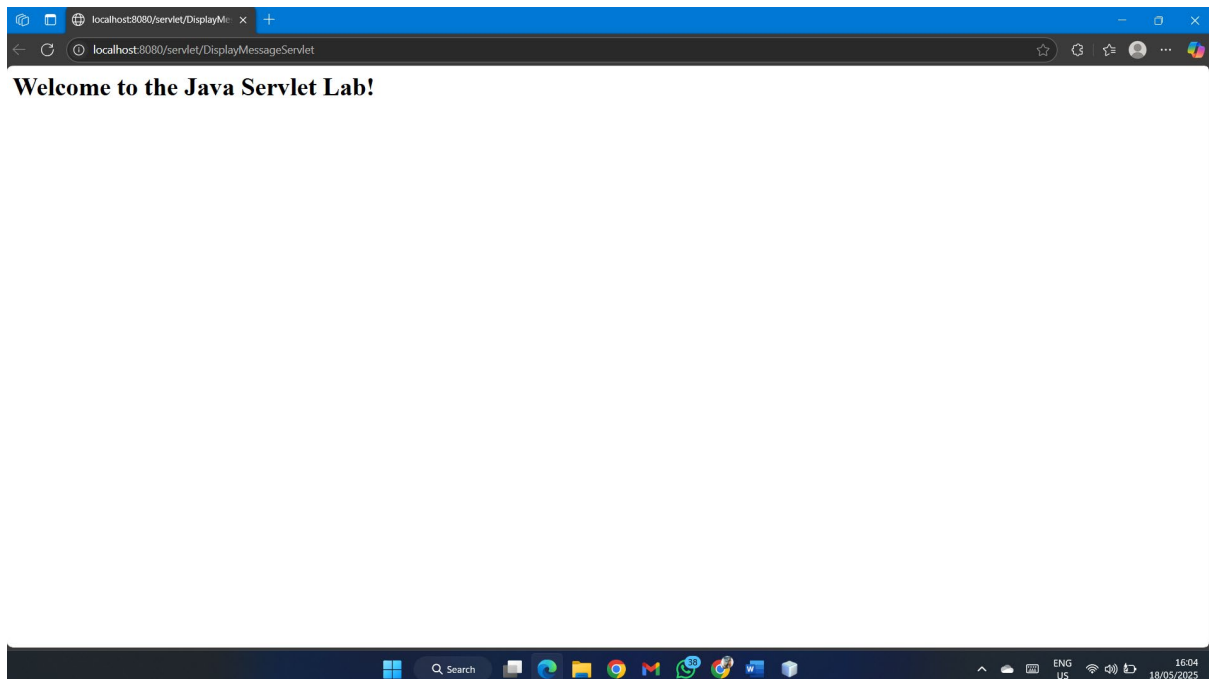
Deployment Descriptor (`web.xml`) (if not using annotations):

```
<web-app xmlns="http://java.sun.com/xml/ns/javaee"
 version="3.0">
 <servlet>
 <servlet-name>DisplayMessageServlet</servlet-name>  <servlet-
class>com.example.DisplayMessageServlet</servlet-class>  </servlet>

 <servlet-mapping>
  <servlet-name>DisplayMessageServlet</servlet-name>
 <url-pattern>/displayMessage</url-pattern>
 </servlet-mapping>
</web
```
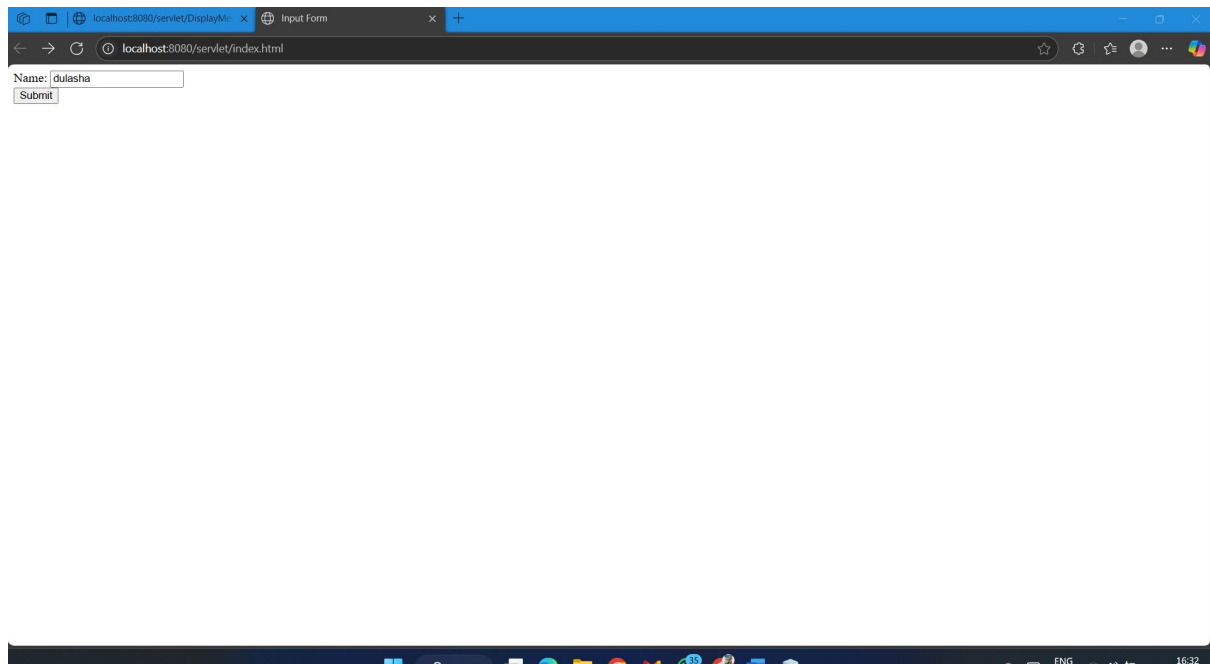

Lab Task 2: Get User Input from Form and Display

```
<!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>
```

Servlet Code (GetUserInputServlet.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("/getUserInput")

public class GetUserInputServlet extends HttpServlet {

   @Override

   protected void doPost(HttpServletRequest request, HttpServletResponse response) throws ServletException, IOException {

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

      response.setContentType("text/html");

```
        PrintWriter out = response.getWriter();

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

        out.println("<h1>Hello, " + username + "!</h1>");

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

    }

}
```
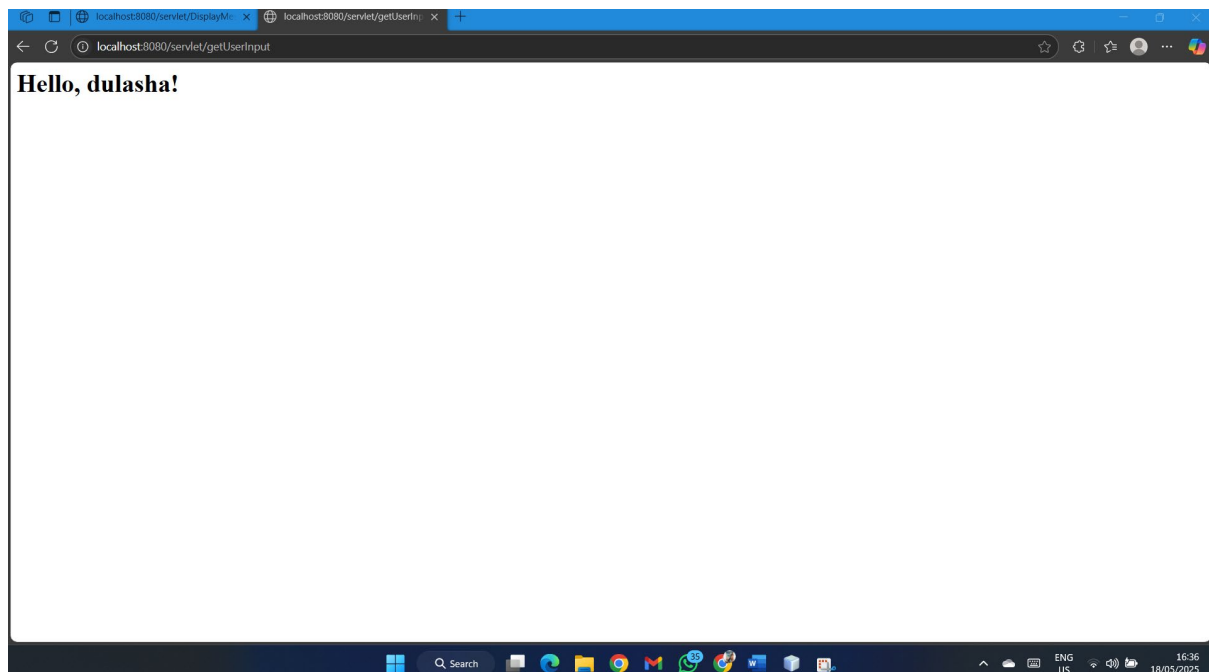

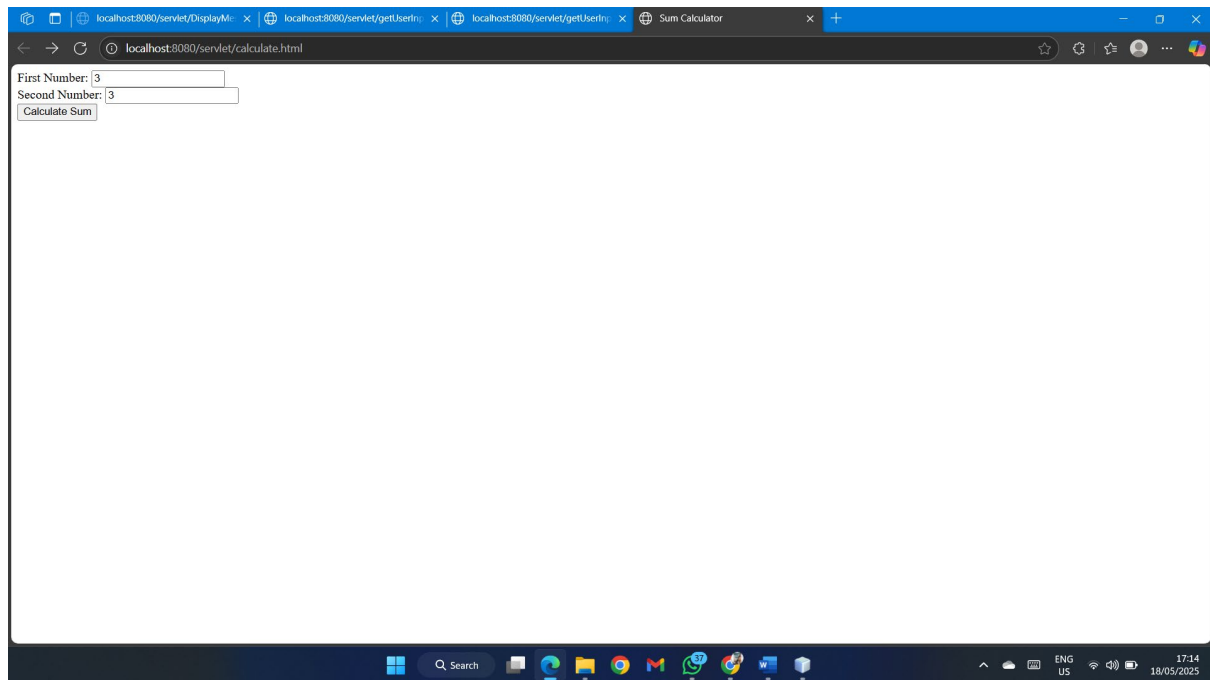## Lab Task 3: Get Multiple Inputs, Perform Calculation, and Display Result

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>
```

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

```java
package com.example;

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("/calculateSum")

public class CalculateSumServlet extends HttpServlet {

 @Override

 protected void doPost(HttpServletRequest request, HttpServletResponse  response)

 throws ServletException, IOException {
```

```java
int num1 = Integer.parseInt(request.getParameter("num1"));

int num2 = Integer.parseInt(request.getParameter("num2"));

int sum = num1 + num2;

response.setContentType("text/html");

PrintWriter out = response.getWriter();


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

out.println("<h1>The sum of " + num1 + " and " + num2 + " is: " + sum  + "</h1>");

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

} }
```
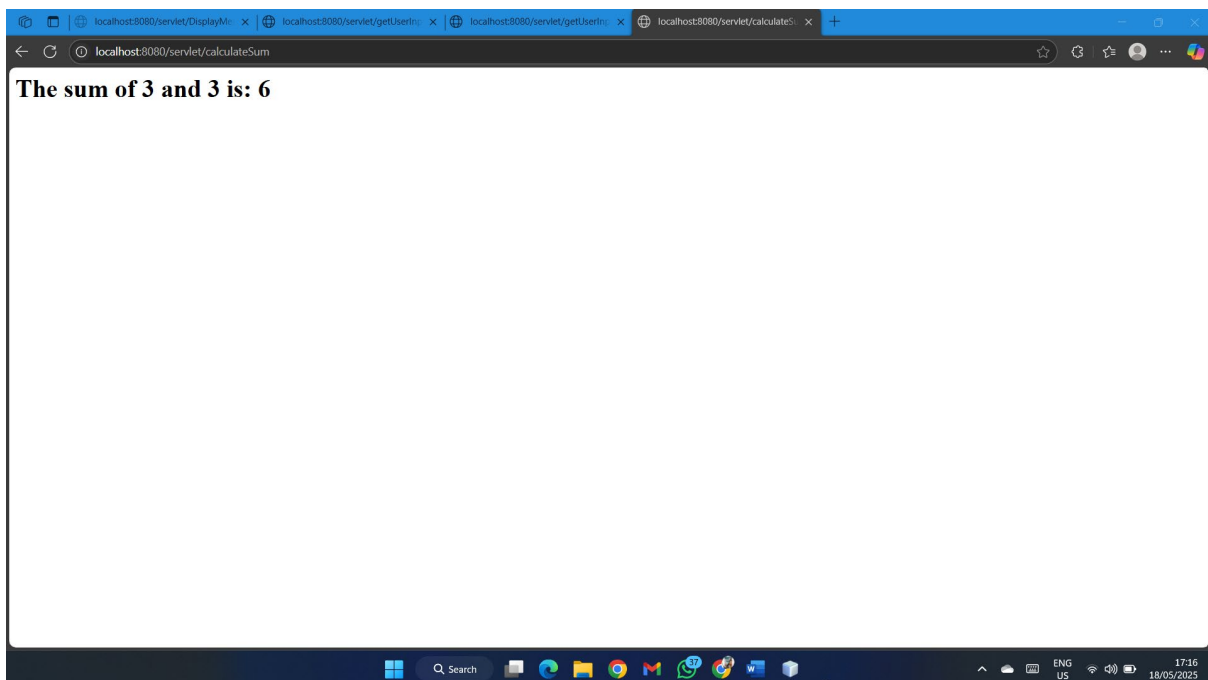

Lab Task 4: Java Servlet with Database CRUD Operations

1. **Set up a database** with a table named `stock` (fields: `id`, `product_name`, `quantity`).

```sql
CREATE DATABASE stock_management;
USE stock_management;

CREATE TABLE stock (
id INT AUTO_INCREMENT PRIMARY KEY,
 product_name VARCHAR(255),
 quantity INT
```

);

HTML Form (stockForm.html)

```
<!DOCTYPE html>
<html>
<head><title>Stock Management</title></head>
<body>
 <h2>Manage Stock</h2>
 <form action="stockAction" method="POST">
 Product Name: <input type="text" name="product_name"
required><br>  Quantity: <input type="number" name="quantity"
required><br>  <input type="submit" name="action" value="Add
Product">  <input type="submit"
name="action" value="Update Product">  <input type="submit"
name="action" value="Delete Product">  </form>
</body>
</html>
```

Manage Stock

Product Name: soap
Quantity: 2
Add Product   Update Product   Delete Product

Servlet Code (StockManagementServlet.java)

```
import java.io.IOException;
import java.io.PrintWriter;
import java.sql.*;
import javax.servlet.ServletException;
import javax.servlet.annotation.WebServlet;
import javax.servlet.http.HttpServlet;
import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;
```

```java
@WebServlet("/stockAction")
public class StockManagementServlet extends HttpServlet {

 private Connection getConnection() throws SQLException {  String
url = "jdbc:mysql://localhost:3306/stock_management";  String
username = "root";
 String password = "root"; // replace with your database
password  return DriverManager.getConnection(url, username,
password);  }

 protected void doPost(HttpServletRequest request,
HttpServletResponse  response)
 throws ServletException, IOException {
 String action = request.getParameter("action");
 String productName = request.getParameter("product_name");  int
quantity = Integer.parseInt(request.getParameter("quantity"));
 try (Connection conn = getConnection()) {
 switch(action) {
 case "Add Product":
 try (PreparedStatement stmt = conn.prepareStatement(  "INSERT  INTO
stock (product_name, quantity)  VALUES (?, ?)")) {
 stmt.setString(1, productName);
 stmt.setInt(2, quantity);
 stmt.executeUpdate();
                   response.getWriter().write("<h1>Product Added
Successfully</h1>");
 }
                   break;
 case "Update Product":
 try (PreparedStatement stmt = conn.prepareStatement(  "UPDATE stock SET
quantity = ? WHERE product_name  = ?")) {
 stmt.setInt(1, quantity);
                   stmt.setString(2, productName);
 stmt.executeUpdate();
                   response.getWriter().write("<h1>Product Updated
Successfully</h1>");
 }
                   break;
 case "Delete Product":
 try (PreparedStatement stmt = conn.prepareStatement(  "DELETE FROM
stock WHERE product_name = ?")) {  stmt.setString(1, productName);
                      stmt.executeUpdate();
 response.getWriter().write("<h1>Product
Deleted  Successfully</h1>");
 }
                   break;
 default:
 response.getWriter().write("<h1>Invalid Action</h1>");  }
 } catch (SQLException e) {


 e.printStackTrace();
 response.getWriter().write("<h1>Database Error: "
+  e.getMessage() + "</h1>");
 }
 }
}
```

Product Added Successfully

Back to Form

Extra options

				id	product_name	quantity
☐	🖉 Edit	Copy	⊖ Delete	1	shampoo	2
☐	🖉 Edit	Copy	⊖ Delete	3	soap	2
☐	🖉 Edit	Copy	⊖ Delete	4	CR books	12

Product Updated Successfully

Back to Form

				id	product_name	quantity
☐	🖉 Edit	Copy	⊖ Delete	1	shampoo	2
☐	🖉 Edit	Copy	⊖ Delete	3	soap	2
☐	🖉 Edit	Copy	⊖ Delete	4	CR books	10

Product Deleted Successfully

Back to Form

				id	product_name	quantity
☐	🖉 Edit	Copy	⊖ Delete	1	shampoo	2
☐	🖉 Edit	Copy	⊖ Delete	4	CR books	10