Lab Assignment -7

Creating the Web Service in Eclipse

1. Open Eclipse and create a new Java project. In the "New Project" dialog, select "Java Project" and click "Next".

2. Give your project a name and click "Finish".

3. Right-click on your project in the Project Explorer and select "New" -> "Other".

4. In the "New" dialog, expand the "Web" folder and select "Dynamic Web Project". Click "Next".

5. Give your project a name and click "Next".

6. Select the "Target runtime" you want to use (e.g. Apache Tomcat) and click "Next".

7. Make sure "Generate web.xml deployment descriptor" is checked and click "Finish".

At this point, Eclipse will create a new project with a `WebContent` folder containing a `web.xml` file, and a `src` folder for your Java code.

8. In the `src` folder, create a new Java class for your web service. In this example, we'll call it `CalculatorService`.

```java
package com.example;

import javax.jws.WebMethod;
import javax.jws.WebService;

@WebService
public class CalculatorService {

    @WebMethod
    public int add(int a, int b) {
        return a + b;
    }
    @WebMethod
    public int subtract(int a, int b) {
        return a - b;
    }

    @WebMethod
    public int multiply(int a, int b) {
        return a * b;
    }

    @WebMethod
    public int divide(int a, int b) {
        if (b == 0) {
            throw new ArithmeticException("Cannot divide by zero!");
        }
        return a / b;
    }
}
```

In this example, we've created a simple SOAP web service using WSDL at the URL `/CalculatorService`. It provides four basic arithmetic operations, add, subtract, multiply and divide.

9. Save your Java class and run the project on the server by right-clicking on the project in the Project Explorer and selecting "Run As" -> "Run on Server". Select your server (e.g. Tomcat) and click "Finish".

At this point, your web service should be running on your local machine at a URL like `http://localhost:8080/<your-project-name>/CalculatorService`.

Creating the Distributed Application to Consume the Web Service

1. Create a new Java class in the same Eclipse project for your distributed application. In this example, we'll call it `CalculatorClient`.

```java
package com.example;

import java.net.URL;
import javax.xml.namespace.QName;
import javax.xml.ws.Service;

public class CalculatorClient {
    public static void main(String[] args) throws Exception {
        // Define the URL of the web service
        URL url = new URL("http://localhost:8080/<your-project-name>/CalculatorService?wsdl");

        // Define the namespace and name of the web service
        QName qname = new QName("http://example.com/", "CalculatorService");

        // Create a Service object and retrieve a CalculatorService port
        Service service = Service.create(url, qname);
        CalculatorService calcService = service.getPort(CalculatorService.class);

        // Call the add operation on the web service
        int result = calcService.add(4, 5);
        System.out.println("4 + 5 = " + result);

        // Call the subtract operation on the web service
        result = calcService.subtract(10,
```