

Web service exercise

Step 1:

1. Install IntelliJ IDEA Ultimate (Community Edition does not support full Java EE deployment).
2. Install Apache Tomcat 9 or 10.
3. Install JDK 8-17 (recommended for JAX-WS compatibility).

Configure Tomcat in IntelliJ:

- Go to File → Settings → Build, Execution, Deployment → Application Servers.
- Click + → Tomcat Server → Browse to installation directory → OK.

Step 2: web service (server side)

Step 1: Create a Java Web Application

- File → New → Project → Java Enterprise → Web Application.
- Project Name: AddService
- Application Server: Tomcat 9.0
- Click Finish.

Step 2: Create the Service Class in src/main/java/com/example/calculator

```
package com.example.calculator;
```

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

```
@WebService  
public class OperatorService {
```

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

```
    @WebMethod
```

```

    public int sub(int a, int b) { return a - b; }

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

    @WebMethod
    public int div(int a, int b) { return a / b; }
}

```

Step 3: Publish the Web Service

```

package com.example.calculator;

import javax.xml.ws.Endpoint;

public class OperatorPublisher {
    public static void main(String[] args) {
        String url = "http://localhost:8080/calculator";
        Endpoint.publish(url, new OperatorService());
        System.out.println("Service started at: " + url + "?wsdl");
    }
}

```

Run OperatorPublisher to start the web service, then open <http://localhost:8080/calculator?wsdl> to verify.

Step 3: create client to consume web service

Step 1: Create a New Project

- File → New → Project → Java Application
- Project Name: AddServiceClient
- No server required.

Step 2: Generate Client Stubs from WSDL

In the terminal, run:

```
wsimport -keep -p com.example.client http://localhost:8080/calculator?wsdl
```

This generates proxy classes in com.example.client.

Step 4: Create the Client Application

```
package com.example.client;

public class TestOperatorClient {
    public static void main(String[] args) {
        OperatorService service = new OperatorService();
        OperatorServiceSoap port = service.getOperatorServiceSoap();

        System.out.println("Add: " + port.add(10, 5));
        System.out.println("Sub: " + port.sub(10, 5));
        System.out.println("Mul: " + port.mul(10, 5));
        System.out.println("Div: " + port.div(10, 5));
    }
}
```

Run the client while the service is active. Expected Output:

```
Add: 15
Sub: 5
Mul: 50
Div: 2
```

Note:

- IntelliJ uses ws-gen and wsimport tools for JAX-WS.
- To deploy to Tomcat as a WAR file:
 - Go to File → Project Structure → Artifacts → Add → Web Application: Exploded.
 - Add WEB-INF/classes and run via Run → Edit Configurations → Tomcat Server → Local.