🚀 Java Web Application: Build & Deploy Guide (Java 17 + Maven + Tomcat)

📁 Project Structure Overview

You have the following Java Web Application project:

JavaWebCalculator/
├── pom.xml
├── src/
│   ├── main/
│   │   ├── java/mypackage/Calculator.java
│   │   └── webapp/
│   │   ├── WEB-INF/web.xml
│   │   └── index.jsp
│   └── test/java/mypackage/CalculatorTest.java

You want to:

- Use **Java 17**

- Use **Apache Maven** for building

- Use **Apache Tomcat** to deploy the .war

🧱 Part 1: Prerequisites - Installing Java, Maven, Tomcat

✅ Step 1: Install Java 17

➤ For Ubuntu/Debian:

sudo apt update
sudo apt install openjdk-17-jdk -y

➤ Verify installation:

java -version
Output should be something like:
openjdk version "17.0.x"...

✅ Step 2: Install Apache Maven

➤ Download & Install:

sudo apt install maven -y

Or manually:

wget
https://downloads.apache.org/maven/maven-3/3.9.6/binaries/apache-maven-3.9.6-bin.t
ar.gz
tar -xvzf apache-maven-3.9.6-bin.tar.gz
sudo mv apache-maven-3.9.6 /opt/maven

➤ Add Maven to PATH:

sudo nano /etc/profile.d/maven.sh

Paste:

export M2_HOME=/opt/maven
export MAVEN_HOME=/opt/maven
export PATH=${M2_HOME}/bin:${PATH}

Then:

sudo chmod +x /etc/profile.d/maven.sh
source /etc/profile.d/maven.sh

➤ **Verify:**

mvn -v

✅ **Step 3: Install Apache Tomcat 9/10**

➤ **Download:**

wget
https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.85/bin/apache-tomcat-9.0.85.tar.gz
tar -xvzf apache-tomcat-9.0.85.tar.gz
sudo mv apache-tomcat-9.0.85 /opt/tomcat

➤ **Start Tomcat:**

cd /opt/tomcat/bin
./startup.sh

➤ **Access Tomcat:**

- Visit http://localhost:8080

  NOTE: For remote servers, you might need to open port 8080 in the firewall.

⚙️ Part 2: Configuring Tomcat for Deployment

✅ Step 4: Add Tomcat User for Manager Access

Edit the file:

sudo nano /opt/tomcat/conf/tomcat-users.xml

Add this inside <tomcat-users>:

<role rolename="manager-gui"/>
<role rolename="manager-script"/>
<user username="admin" password="admin123"
roles="manager-gui,manager-script"/>

> You can change admin and admin123 to your preferred
> username/password.

✅ Step 5: Allow Remote Access (Optional)

Edit:

sudo nano /opt/tomcat/webapps/manager/META-INF/context.xml

Comment out the IP restriction:

<!--
<Valve className="org.apache.catalina.valves.RemoteAddrValve"
    allow="127\.\d+\.\d+\.\d+|::1" />
-->

Then restart Tomcat:

/opt/tomcat/bin/shutdown.sh
/opt/tomcat/bin/startup.sh

🛠️ Part 3: Build the WAR File using Maven

✅ Step 6: Update your pom.xml for Java 17

```
<properties>
    <maven.compiler.source>17</maven.compiler.source>
    <maven.compiler.target>17</maven.compiler.target>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
</properties>

<packaging>war</packaging>
```

✅ Step 7: Clean and Package

Run the following:

```
cd JavaWebCalculator
mvn clean package
```

If everything is correct, the WAR file will be created in:

target/webapp-0.2.war

🚀 Part 4: Deploy WAR to Apache Tomcat

✅ Option 1: Deploy via Manager Web Interface

1. Go to: http://localhost:8080/manager/html

2. Login using your admin/admin123 credentials

3. Go to **Deploy** section

4. Upload the .war file: target/webapp-0.2.war

5. Click **Deploy**

Access your app at:
👉 http://localhost:8080/webapp-0.2

✅ Option 2: Deploy via File Copy

Simply copy the WAR into webapps/:

cp target/webapp-0.2.war /opt/tomcat/webapps/

Tomcat will automatically unpack the WAR and deploy it.

🧪 Part 5: Verify Everything Works

✅ Step 8: Test the Application

Open in browser:

http://localhost:8080/webapp-0.2/

You should see your index.jsp page.

✅ Optional: Enable Logs for Debugging

Tail logs to watch startup or errors:

tail -f /opt/tomcat/logs/catalina.out

📌 Summary

Component	Version
Java	17
Maven	3.9.x
Apache Tomcat	9.0.85 (or latest)
Build Output	WAR file
Deployment Path	/opt/tomcat/webapps