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**Day 23:**

### **Task 1: Singleton**

Implement a Singleton class that manages database connections. Ensure the class adheres strictly to the singleton pattern principles.

### **Step 1: Create a Maven Project in Eclipse**

1. **Open Eclipse:**
  - Launch Eclipse IDE.
2. **Create a New Maven Project:**
  - Go to File -> New -> Project....
  - Select Maven Project and click Next.
  - Check the option Create a simple project (skip archetype selection) and click Next.
  - Fill in the Group Id (e.g., com.example) and Artifact Id (e.g., maven-lifecycle-demo). Click Finish.

### **Step 2: Create Sample Classes and Tests**

1. **Create a Sample Class:**
  - In the src/main/java directory, create a package com.example.
  - In the com.example package, create a class App.java:

```
java
Copy code
package com.example;

public class App {
    public static void main(String[] args) {
        System.out.println("Hello, Maven Lifecycle!");
    }

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

2. **Create a Test Class:**
  - In the src/test/java directory, create a package com.example.
  - In the com.example package, create a class AppTest.java:

```
java
```

```

Copy code
package com.example;

import static org.junit.Assert.assertEquals;

import org.junit.Test;

public class AppTest {
    @Test
    public void testAdd() {
        App app = new App();
        assertEquals(5, app.add(2, 3));
    }
}

```

### Step 3: Documenting the Maven Lifecycle Phases

#### 1. clean:

- **Command:** `mvn clean`
- **What Happens:** Deletes the `target` directory, which contains all the compiled classes and resources from previous builds.
- **Documentation:**

```

csharp
Copy code
$ mvn clean
[INFO] Scanning for projects...
[INFO] -----
[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
[INFO]
[INFO] --- maven-clean-plugin:3.1.0:clean (default-clean) @
maven-lifecycle-demo ---
[INFO] Deleting /path/to/maven-lifecycle-demo/target
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----

```

#### 2. compile:

- **Command:** `mvn compile`
- **What Happens:** Compiles the source code in the `src/main/java` directory.
- **Documentation:**

```

csharp
Copy code
$ mvn compile
[INFO] Scanning for projects...
[INFO] -----

```

```

[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-resources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-demo/target/classes
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----

```

### 3. test:

- **Command:** `mvn test`
- **What Happens:** Runs the tests in the `src/test/java` directory using a testing framework like JUnit.
- **Documentation:**

```

csharp
Copy code
$ mvn test
[INFO] Scanning for projects...
[INFO] -----
[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-testResources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-demo/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @ maven-lifecycle-demo ---
[INFO] Surefire report directory: /path/to/maven-lifecycle-demo/target/surefire-reports

-----
T E S T S
-----

```

```
Running com.example.AppTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed:
0.008 sec
```

Results:

```
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
```

```
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
```

#### 4. **package:**

- **Command:** mvn package
- **What Happens:** Packages the compiled code into a JAR file in the target directory.
- **Documentation:**

```
csharp
Copy code
$ mvn package
[INFO] Scanning for projects...
[INFO] -----
[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-resources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-demo/target/classes
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-testResources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-testCompile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-demo/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @ maven-lifecycle-demo ---
```

```

[INFO] Surefire report directory: /path/to/maven-lifecycle-
demo/target/surefire-reports

-----
T E S T S
-----

Running com.example.AppTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed:
0.007 sec

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-jar-plugin:3.2.0:jar (default-jar) @ maven-
lifecycle-demo ---
[INFO] Building jar: /path/to/maven-lifecycle-demo/target/maven-
lifecycle-demo-1.0-SNAPSHOT.jar
[INFO] -----
-----
[INFO] BUILD SUCCESS
[INFO] -----
-----

```

## 5. install:

- **Command:** `mvn install`
- **What Happens:** Installs the package into the local Maven repository, making it available for other projects on the same machine.
- **Documentation:**

```

csharp
Copy code
$ mvn install
[INFO] Scanning for projects...
[INFO] -----
-----
[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
-----
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-
resources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile)
@ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-
demo/target/classes
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-
testResources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.

```

```

[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-
testCompile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-
demo/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @
maven-lifecycle-demo ---
[INFO] Surefire report directory: /path/to/maven-lifecycle-
demo/target/surefire-reports

-----
T E S T S
-----

Running com.example.AppTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed:
0.008 sec

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

[INFO]
[INFO] --- maven-jar-plugin:3.2.0:jar (default-jar) @ maven-
lifecycle-demo ---
[INFO] Building jar: /path/to/maven-lifecycle-demo/target/maven-
lifecycle-demo-1.0-SNAPSHOT.jar
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @
maven-lifecycle-demo ---
[INFO] Installing /path/to/maven-lifecycle-demo/target/maven-
lifecycle-demo-1.0-SNAPSHOT.jar to
/path/to/.m2/repository/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.jar
[INFO] Installing /path/to/maven-lifecycle-demo/pom.xml to
/path/to/.m2/repository/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.pom
[INFO] -----
-----
[INFO] BUILD SUCCESS
[INFO] -----
-----

```

## 6. deploy:

- **Command:** `mvn deploy`
- **What Happens:** Deploys the package to a remote repository, making it available for other projects across different machines.
- **Note:** This phase requires a remote repository to be configured in your `pom.xml` and `settings.xml`.
- **Documentation:**

xml  
Copy code

```

<!-- Example distributionManagement in pom.xml -->
<distributionManagement>
  <repository>
    <id>releases</id>
    <url>http://your-repository/releases</url>
  </repository>
  <snapshotRepository>
    <id>snapshots</id>
    <url>http://your-repository/snapshots</url>
  </snapshotRepository>
</distributionManagement>

```

**Execute the command:**

```

csharp
Copy code
$ mvn deploy
[INFO] Scanning for projects...
[INFO] -----
[INFO] Building maven-lifecycle-demo 1.0-SNAPSHOT
[INFO] -----
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:resources (default-
resources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:compile (default-compile)
@ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-
demo/target/classes
[INFO]
[INFO] --- maven-resources-plugin:3.2.0:testResources (default-
testResources) @ maven-lifecycle-demo ---
[INFO] Using 'UTF-8' encoding to copy filtered resources.
[INFO] Copying 0 resource
[INFO]
[INFO] --- maven-compiler-plugin:3.8.1:testCompile (default-
testCompile) @ maven-lifecycle-demo ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file to /path/to/maven-lifecycle-
demo/target/test-classes
[INFO]
[INFO] --- maven-surefire-plugin:2.22.2:test (default-test) @
maven-lifecycle-demo ---
[INFO] Surefire report directory: /path/to/maven-lifecycle-
demo/target/surefire-reports

-----
T E S T S
-----

Running com.example.AppTest

```

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.007 sec

Results:

Tests run: 1, Failures: 0, Errors: 0, Skipped: 0

```
[INFO]
[INFO] --- maven-jar-plugin:3.2.0:jar (default-jar) @ maven-
lifecycle-demo ---
[INFO] Building jar: /path/to/maven-lifecycle-demo/target/maven-
lifecycle-demo-1.0-SNAPSHOT.jar
[INFO]
[INFO] --- maven-install-plugin:2.5.2:install (default-install) @
maven-lifecycle-demo ---
[INFO] Installing /path/to/maven-lifecycle-demo/target/maven-
lifecycle-demo-1.0-SNAPSHOT.jar to
/path/to/.m2/repository/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.jar
[INFO] Installing /path/to/maven-lifecycle-demo/pom.xml to
/path/to/.m2/repository/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.pom
[INFO]
[INFO] --- maven-deploy-plugin:2.8.2:deploy (default-deploy) @
maven-lifecycle-demo ---
[INFO] Uploading: http://your-
repository/releases/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.jar
[INFO] Uploaded: http://your-
repository/releases/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.jar (2 KB at 0.5
KB/sec)
[INFO] Uploading: http://your-
repository/releases/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.pom
[INFO] Uploaded: http://your-
repository/releases/com/example/maven-lifecycle-demo/1.0-
SNAPSHOT/maven-lifecycle-demo-1.0-SNAPSHOT.pom (2 KB at 0.5
KB/sec)
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
-----
```