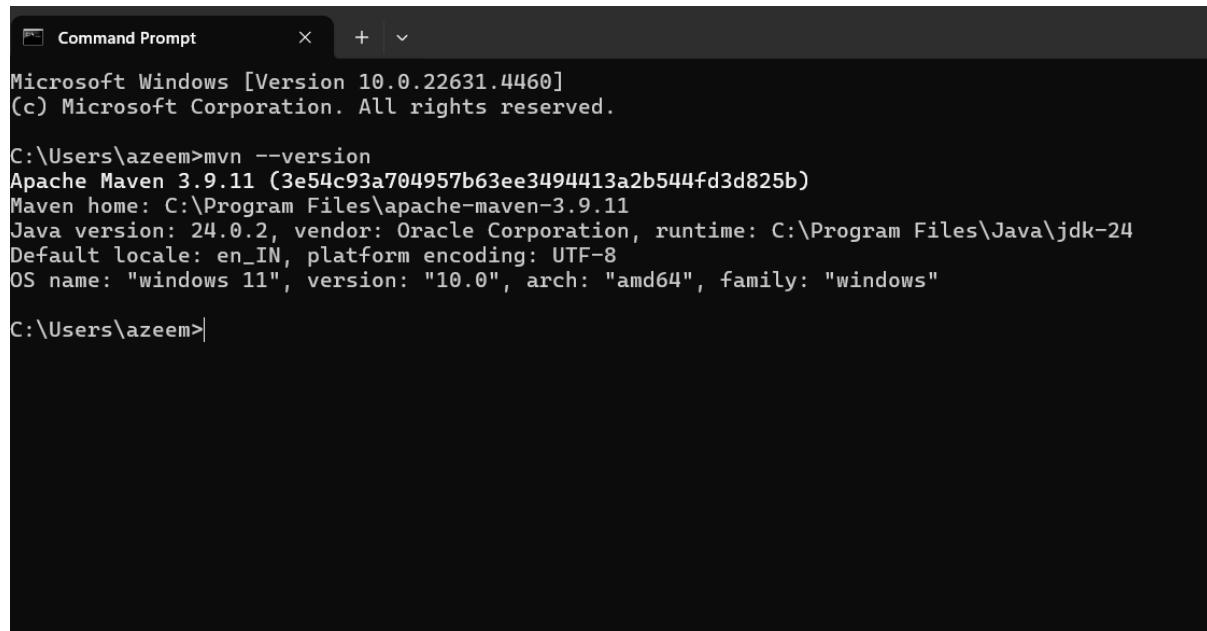


MAVEN PROJECT WEEK-4

TASK-1: CREATION OF MAVEN JAVA PROJECT

1. Checking the version of Maven



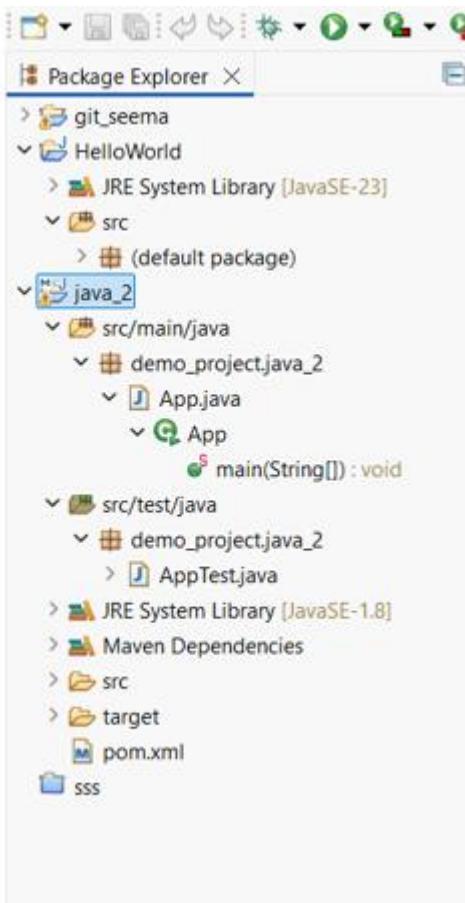
```
Command Prompt + | ▾

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

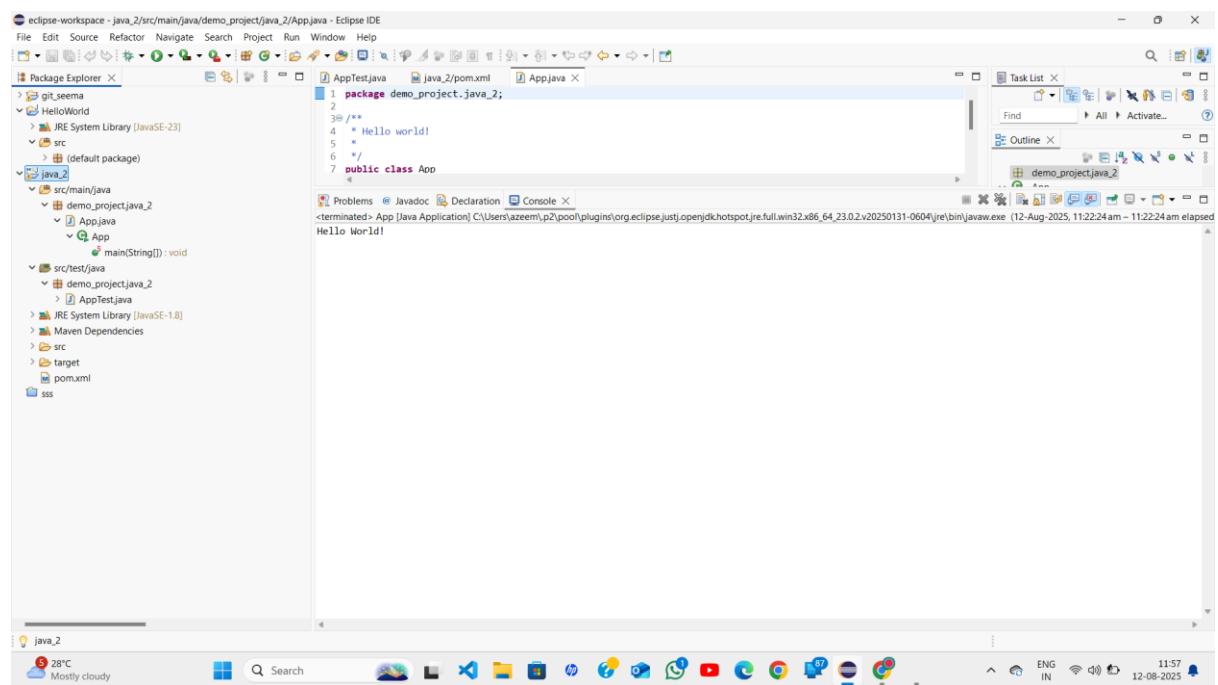
C:\Users\azeem>mvn --version
Apache Maven 3.9.11 (3e54c93a704957b63ee3494413a2b544fd3d825b)
Maven home: C:\Program Files\apache-maven-3.9.11
Java version: 24.0.2, vendor: Oracle Corporation, runtime: C:\Program Files\Java\jdk-24
Default locale: en_IN, platform encoding: UTF-8
OS name: "windows 11", version: "10.0", arch: "amd64", family: "windows"

C:\Users\azeem>
```

2. Maven Java Project Structure



3. Output for Maven Java Project



4.Git commands for pushing the maven java project into the Git Hub

```
MINGW64/c/Users/azeem/eclipse-workspace/java_2
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (main)
$ git init
Initialized empty Git repository in c:/Users/azeem/eclipse-workspace/java_2/.git/
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (master)
$ git add .
warning: in the working copy of 'target/maven-status/maven-compiler-plugin/compile/default-compile/createdFiles.lst', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'target/maven-status/maven-compiler-plugin/testCompile/default-testCompile/createdFiles.lst', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'target/surefire-reports/TEST-demo_project.java_2.AppTest.xml', LF will be replaced by CRLF the next time Git touches it

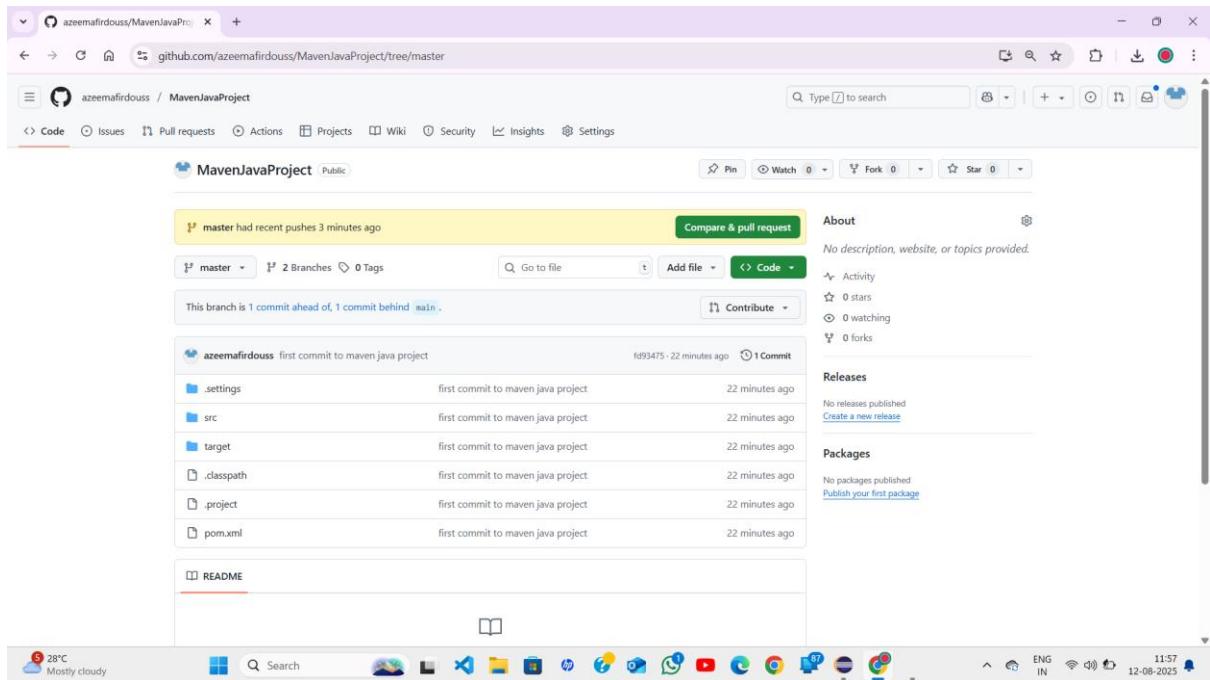
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (master)
$ git commit -m "first commit to maven java project"
[master (root-commit) fd93475] first commit to maven java project
 18 files changed, 230 insertions(+)
 create mode 100644 .classpath
 create mode 100644 .project
 create mode 100644 .settings/org.eclipse.core.resourcesprefs
 create mode 100644 .settings/org.eclipse.jdt.core.preferences
 create mode 100644 .settings/org.eclipse.m2e.core.preferences
 create mode 100644 pom.xml
```

```
MINGW64/c/Users/azeem/eclipse-workspace/java_2
create mode 100644 target/surefire-reports/TEST-demo_project.java_2.AppTest.xml
create mode 100644 target/surefire-reports/demo_project.java_2.AppTest.txt
create mode 100644 target/test-classes/demo_project/java_2/AppTest.class

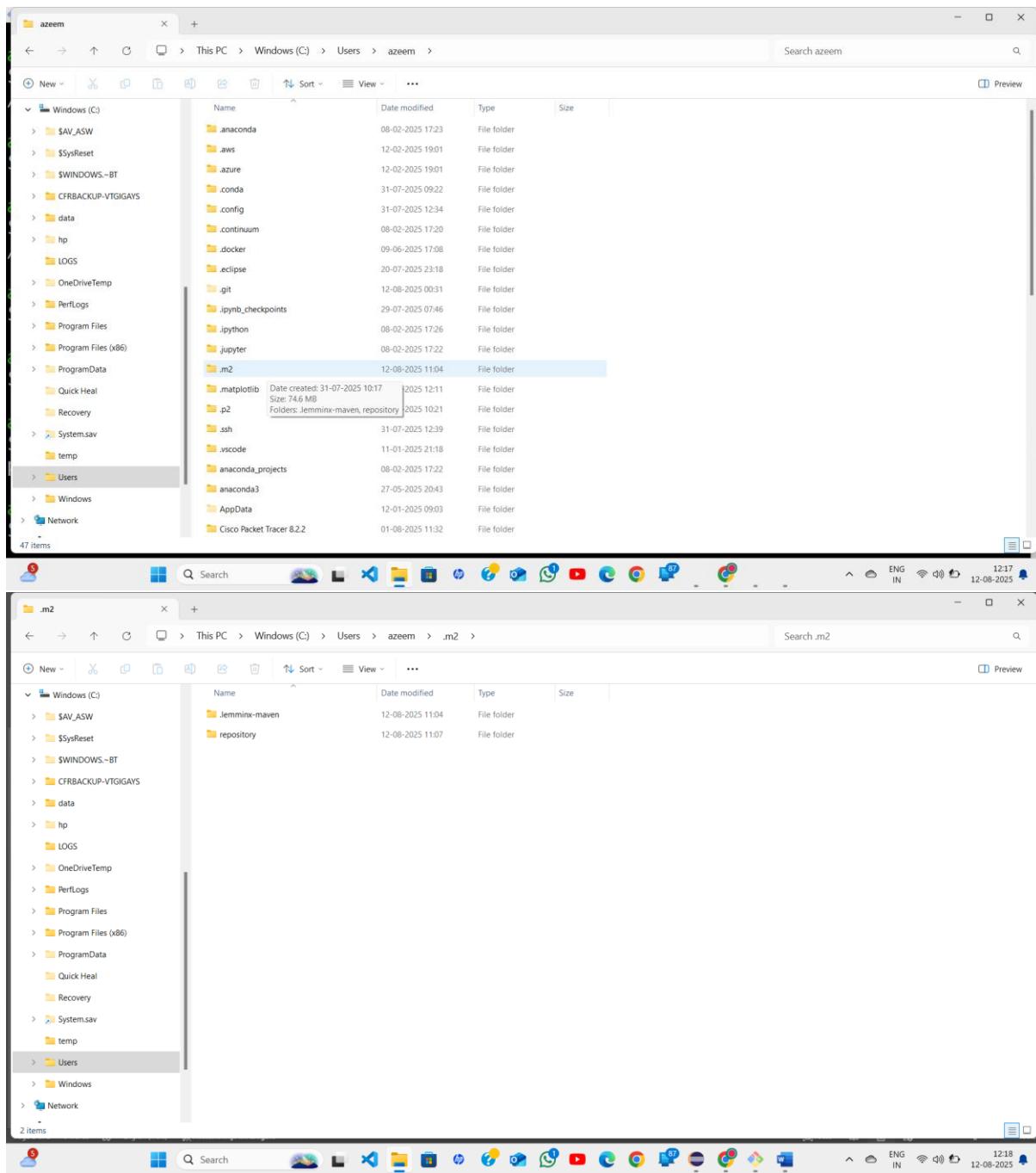
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (master)
$ git remote add origin https://github.com/azeemafirdouss/MavenJavaProject.git

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (master)
$ git push -u origin master
Enumerating objects: 45, done.
Counting objects: 100% (45/45), done.
Delta compression using up to 12 threads
Compressing objects: 100% (25/25), done.
Writing objects: 100% (45/45), 7.49 KiB | 156.00 KiB/s, done.
Total 45 (delta 0), reused 0 (delta 0), pack-reused 0 (from 0)
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:   https://github.com/azeemafirdouss/MavenJavaProject/pull/new/master
remote:
To https://github.com/azeemafirdouss/MavenJavaProject.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

```
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/java_2 (master)
$ |
```

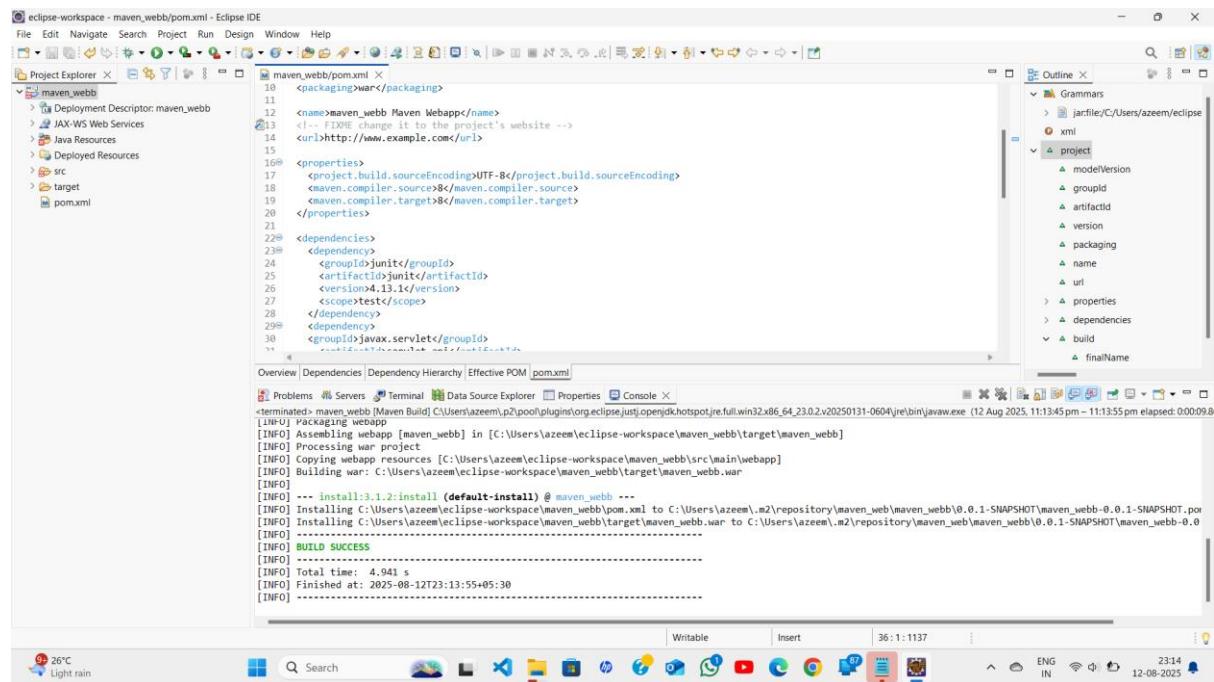
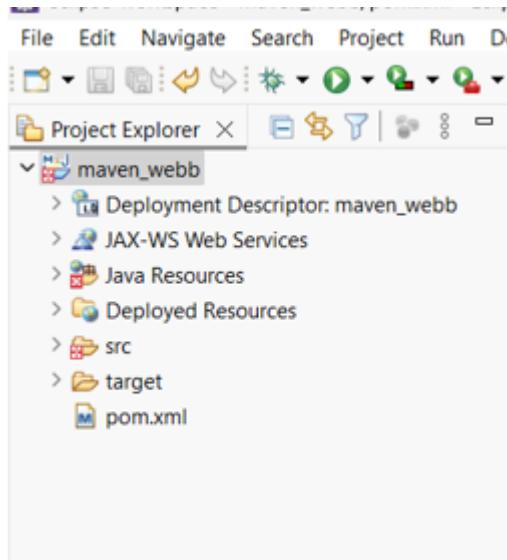
6) .m2 folder in users



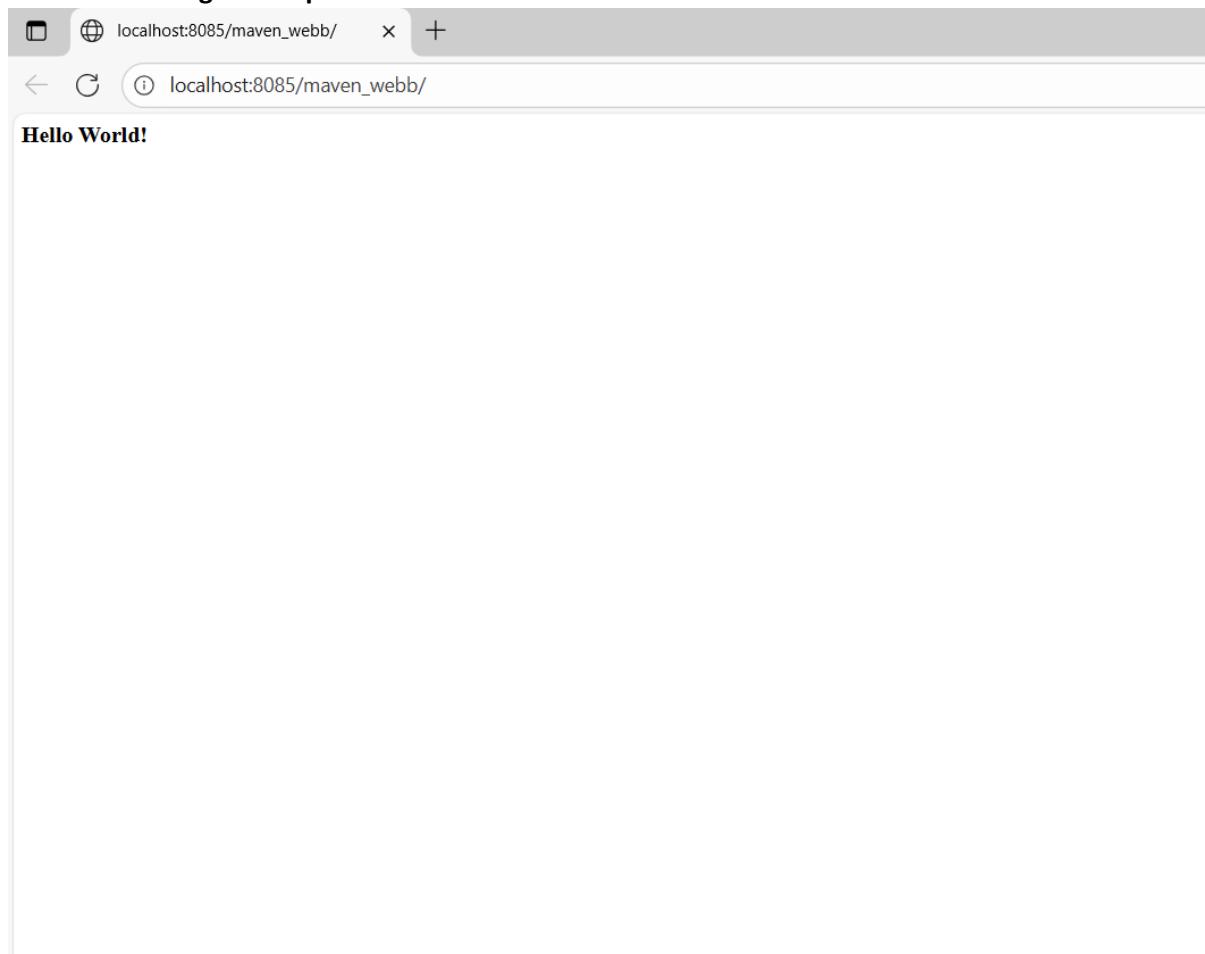
Finally, we have Successfully completed the Creation of Maven Java Project

TASK 2: Creation of Maven web Java Project

1. Maven WEB Project Structure



Server is running on the port 8085



Tomcat

The screenshot shows the Apache Tomcat 9.0.108 homepage. At the top, there's a navigation bar with links to Home, Documentation, Configuration, Examples, Wiki, and Mailing Lists. On the right of the navigation bar are icons for Find Help, Server Status, Manager App, and Host Manager. The main content area features a green banner with the text "If you're seeing this, you've successfully installed Tomcat. Congratulations!" Below this is a cartoon cat icon and a list of recommended reading: Security Considerations How-To, Manager Application How-To, and Clustering/Session Replication How-To. To the right of the banner are three buttons: Server Status, Manager App, and Host Manager. Below the banner, there's a "Developer Quick Start" section with links to Tomcat Setup, First Web Application, Realms & AAA, JDBC DataSources, Examples, and Servlet Specifications/Tomcat Versions. The main content area is divided into three columns: "Managing Tomcat" (with links to Release Notes, Changelog, Migration Guide, and Security Notices), "Documentation" (with links to Tomcat 9.0 Documentation, Tomcat 9.0 Configuration, and Tomcat Wiki), and "Getting Help" (with links to FAQ and Mailing Lists, and information about mailing lists like tomcat-announce, tomcat-users, taglibs-user, and tomcat-dev). The bottom of the page shows a Windows taskbar with various pinned icons and system status indicators.

4.Git Commands for Pushing the Maven WEB Project into the Git Hub

```
azeem@LAPTOP-MUV4INQ MINGW64 ~ (main)
$ pwd
/c/Users/azeem

azeem@LAPTOP-MUV4INQ MINGW64 ~ (main)
$ cd

azeem@LAPTOP-MUV4INQ MINGW64 ~ (main)
$ cd eclipse-workspace

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace (main)
$ cd maven_webb

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (main)
$ ls
pom.xml  src/  target/

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (main)
$ git init
Initialized empty Git repository in C:/Users/azeem/eclipse-workspace/maven_webb/.git/

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (master)
$ git add .
warning: in the working copy of 'src/main/webapp/WEB-INF/web.xml', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'src/main/webapp/index.jsp', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'target/maven_webb/WEB-INF/web.xml', LF will be replaced by CRLF the next time Git touches it
warning: in the working copy of 'target/maven_webb/index.jsp', LF will be replaced by CRLF the next time Git touches it

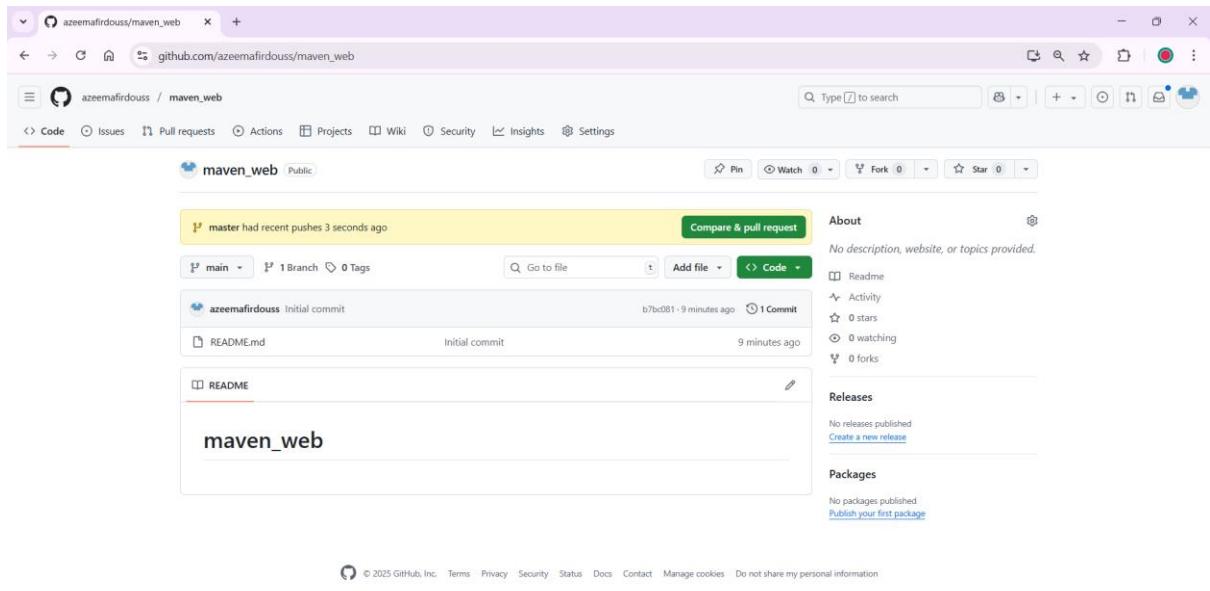
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (master)
$ git commit -m "maven web push"
[master (root-commit) 9c3ab06] maven web push
 21 files changed, 232 insertions(+)
 create mode 100644 .classpath
 create mode 100644 .mvn/jvm.config
 create mode 100644 .mvn/maven.config
 create mode 100644 .project
 create mode 100644 .settings/.jsdtscope
 create mode 100644 .settings/org.eclipse.core.resources_prefs

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (master)
$ git remote add origin https://github.com/azeemafirdouss/maven_web.git

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (master)
$ git push -u origin master
Enumerating objects: 31, done.
Counting objects: 100% (31/31), done.
Delta compression using up to 12 threads
Compressing objects: 100% (22/22), done.
Writing objects: 100% (31/31), 197.61 KiB | 3.87 MiB/s, done.
Total 31 (delta 1), reused 0 (delta 0), pack-reused 0 (from 0)
remote: Resolving deltas: 100% (1/1), done.
remote:
remote: Create a pull request for 'master' on GitHub by visiting:
remote:   https://github.com/azeemafirdouss/maven_web/pull/new/master
remote:
To https://github.com/azeemafirdouss/maven_web.git
 * [new branch]      master -> master
branch 'master' set up to track 'origin/master'.
```

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/maven_webb (master)

5.Git Repository with the Maven WEB Project



Finally, we have Successfully completed the Creation of Maven Web Project

Scenario Based Questions

1. If my error is about:

Failed to execute goal org.apache.maven.plugins:maven-compiler-plugin:3.8.1:compile

[ERROR] -> [Help 1]

[ERROR] To see the full stack trace of the errors, re-run Maven with the -X switch.

How can I resolve it using maven terminal?

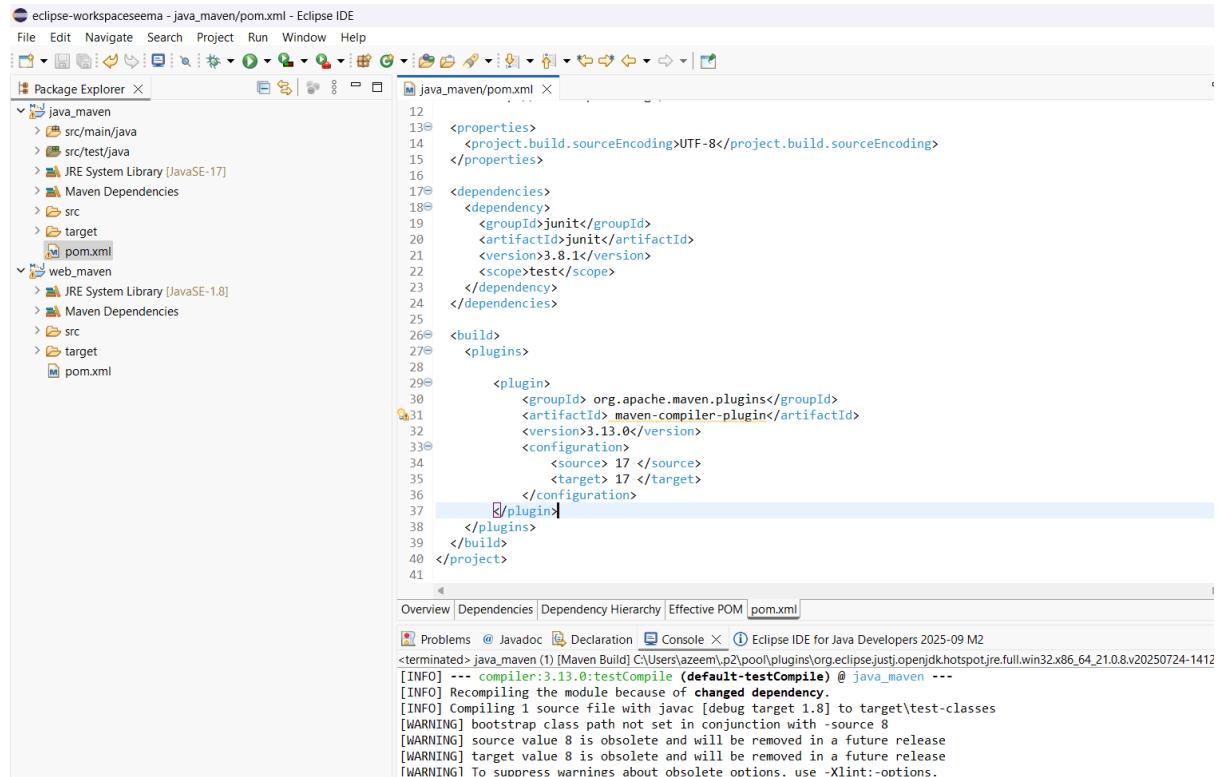
```
MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
azeem@LAPTOP-MUV04INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn clean compile -X
Apache Maven 3.9.11 (3e54c93a704957b63ee3494413a2b544fd3d825b)
Maven home: c:\Program Files\apache-maven-3.9.11
Java version: 17.0.0.1, vendor: oracle corporation, runtime: c:\Program Files\jdk-17.0.0.1
Default locale: en_IN, platform encoding: cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"
[DEBUG] Created new class realm maven.api
[DEBUG] Importing foreign packages into class realm maven.api
[DEBUG] Imported: javax.annotation.* < plexus.core
[DEBUG] Imported: javax.annotation.security.* < plexus.core
[DEBUG] Imported: javax.inject.* < plexus.core
[DEBUG] Imported: org.apache.maven.* < plexus.core
[DEBUG] Imported: org.apache.maven.artifact < plexus.core
[DEBUG] Imported: org.apache.maven.classrealm < plexus.core
[DEBUG] Imported: org.apache.maven.cli < plexus.core
[DEBUG] Imported: org.apache.maven.configuration < plexus.co
re
[DEBUG] Imported: org.apache.maven.exception < plexus.core
[DEBUG] Imported: org.apache.maven.execution < plexus.core
[DEBUG] Imported: org.apache.maven.execution.scope < plexus.
core
[DEBUG] Imported: org.apache.maven.graph < plexus.core
[DEBUG] Imported: org.apache.maven.lifecycle < plexus.core
[DEBUG] Imported: org.apache.maven.model < plexus.core
[DEBUG] Imported: org.apache.maven.monitor < plexus.core
[DEBUG] Imported: org.apache.maven.plugin < plexus.core
[DEBUG] Imported: org.apache.maven.profiles < plexus.core
[DEBUG] Imported: org.apache.maven.project < plexus.core
[DEBUG] Imported: org.apache.maven.reporting < plexus.core
[DEBUG] Imported: org.apache.maven.repository < plexus.core
[DEBUG] Imported: org.apache.maven.rtinfo < plexus.core
[DEBUG] Imported: org.apache.maven.settings < plexus.core
[DEBUG] Imported: org.apache.maven.toolchain < plexus.core
[DEBUG] Imported: org.apache.maven.usability < plexus.core
```

```
24°C Cloudy Search 15-08-2025 08:46 ENG IN
MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
.pom
[DEBUG] Reading global toolchains from c:\Program Files\apache-
maven-3.9.11\conf\toolchains.xml
[DEBUG] Reading user toolchains from c:\Users\azeem\.m2\toolch
ains.xml
[DEBUG] Using local repository at c:\Users\azeem\.m2\repositor
y
[DEBUG] Using manager EnhancedLocalRepositoryManager with prio
rity 10.0 for c:\Users\azeem\.m2\repository
[INFO] Scanning for projects...
[DEBUG] Extension realms for project maven_java:java_maven:jar
:0.0.1-SNAPSHOT: (none)
[DEBUG] Looking up lifecycle mappings for packaging jar from C
lassRealm[plexus.core, parent: null]
[DEBUG] === REACTOR BUILD PLAN ====
[DEBUG] Project: maven_java:java_maven:jar:0.0.1-SNAPSHOT
[DEBUG] Tasks: [clean, compile]
[DEBUG] Style: Regular
[DEBUG] ====
[INFO] -----
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ jar ]-----
[DEBUG] Lifecycle clean -> [pre-clean, clean, post-clean]
[DEBUG] Lifecycle default -> [validate, initialize, generate-s
ources, process-sources, generate-resources, process-resources
, compile, process-classes, generate-test-sources, process-te
st-sources, generate-test-resources, process-test-resources, te
st-compile, process-test-classes, test, prepare-package, packa
ge, pre-integration-test, integration-test, post-integration-t
est, verify, install, deploy]
[DEBUG] Lifecycle site -> [pre-site, site, post-site, site-dep
loy]
[DEBUG] Lifecycle clean -> [pre-clean, clean, post-clean]
```

```

MINGW64/c:/Users/azeem/eclipse-workspaceseema/java_maven
main.java
[DEBUG] c:/Users/azeem/eclipse-workspaceseema/java_maven\targ
et\generated-sources\annotations
[DEBUG] Command line options:
[DEBUG] -d C:/Users/azeem/eclipse-workspaceseema/java_maven\tar
get\classes -classpath C:/Users/azeem/eclipse-workspaceseema\j
ava_maven\target\classes; -sourcepath C:/Users/azeem/eclips
eworkspaceseema/java_maven/src/main/java;C:/Users/azeem/eclips
eworkspaceseema/java_maven\target\generated-sources\annotation
s; -s C:/Users/azeem/eclipse-workspaceseema/java_maven\tar
get\generated-sources\annotations -g -target 1.8 -source 1.8 -enco
ding UTF-8 -XDuseUnsharedTable=true
[DEBUG] incrementalBuildHelper#beforeRebuildExecution
[INFO] compiling 1 source file with javac [debug target 1.8] t
o target\classes
[DEBUG] incrementalBuildHelper#afterRebuildExecution
[WARNING] bootstrap class path not set in conjunction with -so
urce 8
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 1.331 s
[INFO] Finished at: 2025-08-15T08:38:20+05:30
[INFO] -----
[DEBUG] Shutting down adapter factory; available factories [fi
le-lock, rlock-local, semaphore-local, noop]; available name
mappers [discriminating, file-gav, file-hgav, file-static, gav
, static]
[DEBUG] Shutting down 'file-lock' factory
[DEBUG] Shutting down 'rlock-local' factory
[DEBUG] Shutting down 'semaphore-local' factory
[DEBUG] Shutting down 'noop' factory
azeem@APTOP-MUVD4INQ MINGW64 ~/eclipse-workspaceseema/java_ma
ven (apply-bugfix-clean)
$
```

2. A dependency you added is not recognized by the compiler. What steps would you take to confirm it is available in .m2 and listed in dependency tree?



File Explorer:

```

3.12.0
    +-- .m2
        +-- repository
            +-- org
                +-- apache
                    +-- commons
                        +-- commons-lang3
                            +-- 3.12.0
                                +-- _remote.repositories
                                +-- commons-lang3-3.12.0
                                +-- commons-lang3-3.12.0.jar.sha1
                                +-- commons-lang3-3.12.0.pom
                                +-- commons-lang3-3.12.0.pom.sha1

```

File List:

Name	Date modified	Type	Size
_remote.repositories	12-08-2025 11:03	REPOSITORIES File	1 KB
commons-lang3-3.12.0	12-08-2025 11:03	Executable Jar File	574 KB
commons-lang3-3.12.0.jar.sha1	12-08-2025 11:03	SHA1 File	1 KB
commons-lang3-3.12.0.pom	12-08-2025 11:03	POM File	30 KB
commons-lang3-3.12.0.pom.sha1	12-08-2025 11:03	SHA1 File	1 KB

File System View:

- Videos
- Gallery
- Screenshots
- PROJECT 2-2
- WEEK 3
- practise
- This PC
 - Windows (C:)
 - apache-tomcat-9.0.108
 - CFRBACKUP-VTGIGAYS
 - data
 - LOGS
 - PerfLogs
 - Program Files
 - Program Files (x86)
 - temp
 - Users
 - Windows
- Network

Terminal:

```

MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven
mvn (apply-bugfix-clean)
$ mvn dependency:tree
[INFO] Scanning for projects...
[INFO] [INFO] < maven Java:maven >
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] [jar]
[INFO]
[INFO] --- dependency:3.7.0:tree (default-cli) @ java_maven ---
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-sink-api/1.12.0/doxia-sink-api-1.12.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-sink-api/1.12.0/doxia-sink-api-1.12.0.pom (1.5 kB at 1.9 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia/1.12.0/doxia-1.12.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia/1.12.0/doxia-1.12.0.pom (18 kB at 114 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-logging-api/1.12.0/doxia-logging-api-1.12.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-logging-api/1.12.0/doxia-logging-api-1.12.0.pom (1.5 kB at 22 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-reporting-api/3.1.1/doxia-reporting-api-3.1.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-reporting-api/3.1.1/doxia-reporting-api-3.1.1.pom (3.8 kB at 22 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-sink-api/1.11.1/doxia-sink-api-1.11.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-sink-api/1.11.1/doxia-sink-api-1.11.1.pom (1.6 kB at 20 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia/1.11.1/doxia-1.11.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia/1.11.1/doxia-1.11.1.pom (18 kB at 147 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-logging-api/1.11.1/doxia-logging-api-1.11.1.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-logging-api/1.11.1/doxia-logging-api-1.11.1.pom (1.6 kB at 20 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/reporting/maven-reporting-impl/3.2.0/maven-reporting-impl-3.2.0.pom
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/reporting/maven-reporting-impl/3.2.0/maven-reporting-impl-3.2.0.pom (7.6 kB at 115 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/doxia/doxia-decoration-model/1.11.1/doxia-decoration-model-1.11.1.pom

```

Taskbar:

System Status:

- ENG IN
- Wi-Fi
- Battery
- 08:52
- 15-08-2025

```

MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-analyzer/1.14.1/maven-dependency-analyzer-1.14.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-i18n/1.0-beta-10/plexus-i18n-1.0-beta-10.jar (12 kB at 5.5 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm/9.7/asm-9.7.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/velocity/velocity-tools/2.0/velocity-tools-2.0.jar (347 kB at 160 kB/s)
downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-tree/3.3.0/maven-dependency-tree-3.3.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-analyzer/1.14.1/maven-dependency-analyzer-1.14.1.jar (42 kB at 18 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.3.2/maven-common-artifact-filters-3.3.2.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-dependency-tree/3.3.0/maven-dependency-tree-3.3.0.jar (43 kB at 19 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-artifact-transfer/0.13.1/maven-artifact-transfer-0.13.1.jar
Downloaded from central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm/9.7/asm-9.7.jar (125 kB at 54 kB/s)
Downloading from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-component-annotations/2.0.0/plexus-component-annotations-2.0.0.jar
Downloaded from central: https://repo.maven.apache.org/maven2/dom4j/dom4j/1.1/dom4j-1.1.jar (457 kB at 197 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/velocity/velocity/1.7/velocity-1.7.jar (450 kB at 187 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/codehaus/plexus/plexus-component-annotations/2.0.0/plexus-component-annotations-2.0.0.jar (4.2 kB at 1.7 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-common-artifact-filters/3.3.2/maven-common-artifact-filters-3.3.2.jar (58 kB at 24 kB/s)
Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/shared/maven-artifact-transfer/0.13.1/maven-artifact-transfer-0.13.1.jar (159 kB at 65 kB/s)
[INFO] maven-jar:junit:junit:jar:3.8.1:test
[INFO] -----
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 15.079 s
[INFO] Finished at: 2025-08-15T08:51:47+05:30
[INFO] -----
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$
```

3. Your Maven build fails due to “Unsupported class version error.” What plugin and configuration would you review?

1. Check the Compiler Plugin Configuration

Open `pom.xml` and look for the `maven-compiler-plugin`:

```

<build>
  <plugins>

    <plugin>
      <groupId> org.apache.maven.plugins</groupId>
      <artifactId> maven-compiler-plugin</artifactId>
      <version>3.11.0</version>
      <configuration>
        <source> 17 </source>
        <target> 17 </target>
      </configuration>
    </plugin>
  </plugins>
</build>
```

Verify the JDK and maven version

```
Command Prompt

Microsoft Windows [Version 10.0.22631.4460]
(c) Microsoft Corporation. All rights reserved.

C:\Users\azeem>java --version
openjdk 17.0.0.1 2024-07-02
OpenJDK Runtime Environment (build 17.0.0.1+2-3)
OpenJDK 64-Bit Server VM (build 17.0.0.1+2-3, mixed mode, sharing)

C:\Users\azeem>mvn --version
Apache Maven 3.9.11 (3e54c93a704957b63ee3494413a2b544fd3d825b)
Maven home: C:\Program Files\apache-maven-3.9.11
Java version: 17.0.0.1, vendor: Oracle Corporation, runtime: C:\Program Files\jdk-17.0.0.1
Default locale: en_IN, platform encoding: Cp1252
OS name: "windows 10", version: "10.0", arch: "amd64", family: "windows"

C:\Users\azeem>
```

Run mvn clean install

```
MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
azeem@LAPTOP-MUV0DINQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn clean install
[INFO] Scanning for projects...
[INFO]
[INFO] --->< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]   ----- [ jar ] -----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resource directory C:\users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resource directory C:\users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] ----- T E S T S -----
[INFO] Running maven_java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0, Time elapsed: 0.016 s -- in maven_java.java_maven.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0
```

```
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] ----- T E S T S -----
[INFO] Running maven_java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0, Time elapsed: 0.016 s -- in maven_java.java_maven.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0
```



```
[INFO] --- jar:3.4.1:jar (default-jar) @ java_maven ---
[INFO] Building jar: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] --- install:3.1.2:install (default-install) @ java_maven ---
[INFO] Installing c:\users\azeem\eclipse-workspaceseema\java_maven\pom.xml to c:\users\azeem\.m2\repository\maven_java\java_maven\0.0.1-SNAPSHOT\java_maven-0.0.1-SNAPSHOT.pom
[INFO] Installing c:\users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.jar to c:\users\azeem\.m2\repository\maven_java\java_maven\0.0.1-SNAPSHOT\java_maven-0.0.1-SNAPSHOT.jar
[INFO]
[INFO] ----- BUILD SUCCESS -----
[INFO]
[INFO] Total time: 4.993 s
[INFO] Finished at: 2025-08-15T09:37:49+05:30
[INFO]
```

4. You need to change your Java application from a WAR to a standalone JAR.

What pom.xml changes are needed?

```
<project xmlns="http://maven.apache.org/POM/4.0.0" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
  <modelVersion>4.0.0</modelVersion>

  <groupId>maven_java</groupId>
  <artifactId>java_maven</artifactId>
  <version>0.0.1-SNAPSHOT</version>
  <packaging>jar</packaging>
```

Change the packaging from jar to war

```
<groupId>maven_java</groupId>
<artifactId>java_maven</artifactId>
<version>0.0.1-SNAPSHOT</version>
<packaging>war</packaging>
```

And	run	mvn	clean	package
	<pre> <scope>test</scope> </dependency> </dependencies> <build> <plugins> <plugin> <groupId> org.apache.maven.plugins</groupId> <artifactId> maven-compiler-plugin</artifactId> <version>3.11.0</version> <configuration> <source> 17 </source> <target> 17 </target> </configuration> </plugin> <plugin> <groupId>org.apache.maven.plugins</groupId> <artifactId>maven-war-plugin</artifactId> <version>3.4.0</version> <configuration> <failOnMissingWebXml>false</failOnMissingWebXml> </configuration> </plugin> </plugins> </build> </project></pre>			

```
MINGW64:/c/Users/azeem/eclipse-workspacesseema/java_maven
azeem@LAPTOP-MUVD4INQ MINGW64 ~/eclipse-workspacesseema/java_maven (master)
$ mvn clean package
[INFO] scanning for projects...
[INFO]
[INFO] -----> maven_jar:java_maven <-----
[INFO] building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] ----- [ war ] -----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] deleting C:\Users\azeem\eclipse-workspacesseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory c:\users\azeem\eclipse-workspacesseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] changes detected - recompiling the module! :source
[INFO] compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory c:\users\azeem\eclipse-workspacesseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] changes detected - recompiling the module! :dependency
[INFO] compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] ----- T E S T S -----
[INFO] Running maven_jar.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.019 s -- in maven_jar.java_maven.AppTest
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, skipped: 0
[INFO]
[INFO] ----- war:3.4.0:war (default-war) @ java_maven -----
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [c:\Users\azeem\eclipse-workspacesseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspacesseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] ----- Total time: 4.662 s
[INFO] Finished at: 2025-08-15T09:49:03+05:30
[INFO] -----
```

5. You are required to change the default build output directory from target/ to build_output/. How would you configure it?

Change the directory from target to build output

```

<build>
    <directory>build_output</directory>
    <plugins>

        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-compiler-plugin</artifactId>
            <version>3.11.0</version>
            <configuration>
                <source>17</source>
                <target>17</target>
            </configuration>
        </plugin>

        <plugin>
            <groupId>org.apache.maven.plugins</groupId>
            <artifactId>maven-war-plugin</artifactId>
            <version>3.4.0</version>
            <configuration>
                <failOnMissingWebXml>false</failOnMissingWebXml>
            </configuration>
        </plugin>
    </plugins>
</build>

```

```

MINGW64/c/Users/azeem/eclipse-workspaceseema/java_maven
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (master)
$ mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] -----[ war ]-----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running maven_java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0 Time elapsed: 0.011 s -- in maven_java.java_maven.AppTest
[INFO]
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]

[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 4.519 s
[INFO] Finished at: 2025-08-15T09:54:24+05:30
[INFO] -----

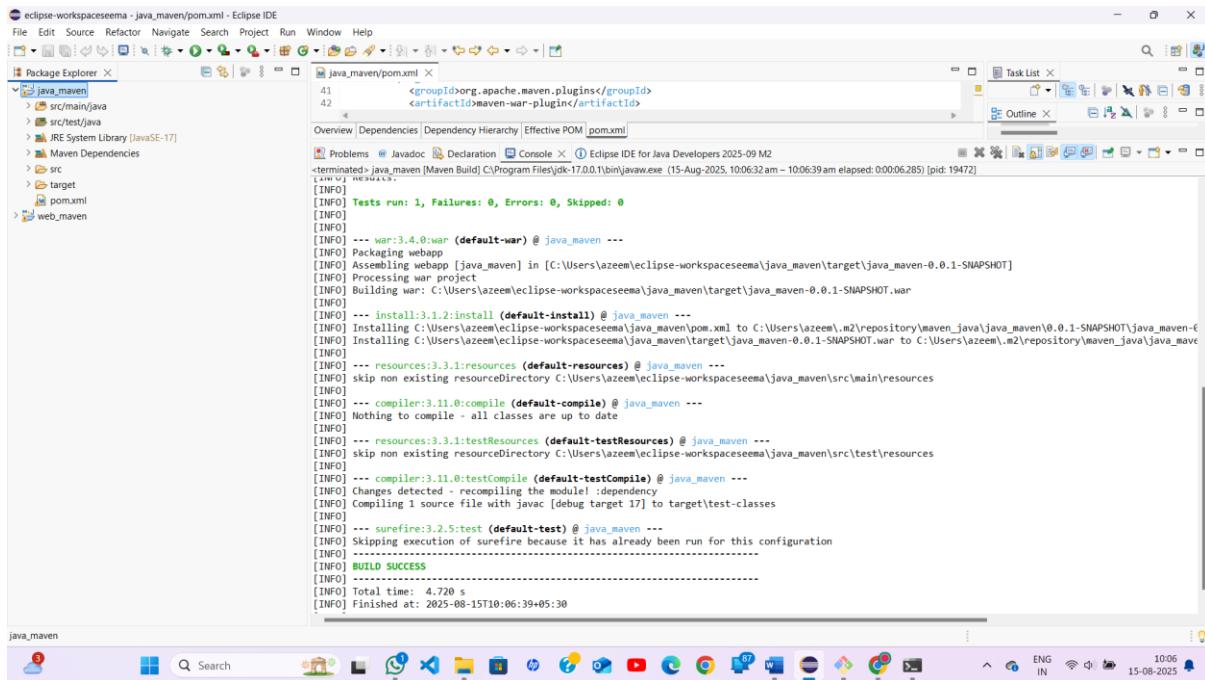
```

6. You want to skip tests during the Maven build. What command would you use?

```
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (master)
$ mvn clean package -DskipTests
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] -----[ war ]-----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Tests are skipped.
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 1.904 s
[INFO] Finished at: 2025-08-15T09:55:20+05:30
[INFO]
```

9. How would you generate a site report (with test coverage, dependency analysis) for a Maven project?

```
3
9      </plugins>
0   </build>
1
2@ <reporting>
3@   <plugins>
4@     <plugin>
5         <groupId>org.apache.maven.plugins</groupId>
5         <artifactId> maven-surefire-report-plugin</artifactId>
7         <version>3.1.2</version>
3       </plugin>
9@     <plugin>
0         <groupId>org.apache.maven.plugins</groupId>
1         <artifactId> maven-project-info-reports-plugin</artifactId>
2         <version>0.8.10</version>
3       </plugin>
4
5   </plugins>
5
7 </reporting>
3 </project>
0 |
```



```

<project xmlns="http://maven.apache.org/POM/4.0.0"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>maven_java</groupId>
    <artifactId>java_maven</artifactId>
    <version>0.0.1-SNAPSHOT</version>
    <packaging>war</packaging>

    <name>java_maven</name>
    <url>http://maven.apache.org</url>

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

    <dependencies>
        <dependency>
            <groupId>junit</groupId>
            <artifactId>junit</artifactId>
            <version>3.8.1</version>
            <scope>test</scope>
        </dependency>
    
```

```
</dependencies>

<build>
  <plugins>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-compiler-plugin</artifactId>
      <version>3.11.0</version>
      <configuration>
        <source>17</source>
        <target>17</target>
      </configuration>
    </plugin>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-war-plugin</artifactId>
      <version>3.4.0</version>
      <configuration>
        <failOnMissingWebXml>false</failOnMissingWebXml>
      </configuration>
    </plugin>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-site-plugin</artifactId>
      <version>4.0.0-M9</version>
    </plugin>
  </plugins>
</build>

<reporting>
  <plugins>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-surefire-report-plugin</artifactId>
      <version>3.1.2</version>
    </plugin>
    <plugin>
      <groupId>org.apache.maven.plugins</groupId>
      <artifactId>maven-project-info-reports-plugin</artifactId>
      <version>3.4.1</version>
    </plugin>
    <plugin>
      <groupId>org.jacoco</groupId>
      <artifactId>jacoco-maven-plugin</artifactId>
      <version>0.8.10</version>
    </plugin>
  </plugins>
</reporting>
```

```

<reportSets>
  <reportSet>
    <reports>
      <report>report</report>
    </reports>
  </reportSet>
</reportSets>
</plugin>
</plugins>
</reporting>
</project>

```

```

MINGW64/c/Users/azeem/eclipse-workspaceseema/java_maven
$ mvn clean verify site
[INFO] Scanning for projects...
[INFO]
[INFO] -----> [ maven_java:java_maven ]<-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] -----[ war ]-----[ war ]
[INFO] Downloading from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-site-plugin/4.0.0-M9/maven-site-plugin-4.0.0-M9.pom
[INFO] Downloaded from central: https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-site-plugin/4.0.0-M9/maven-site-plugin-4.0.0-M9.pom (22 kB at 25 kB/s)
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running maven_java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.015 s -- in maven_java.java_maven.AppTest
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO]

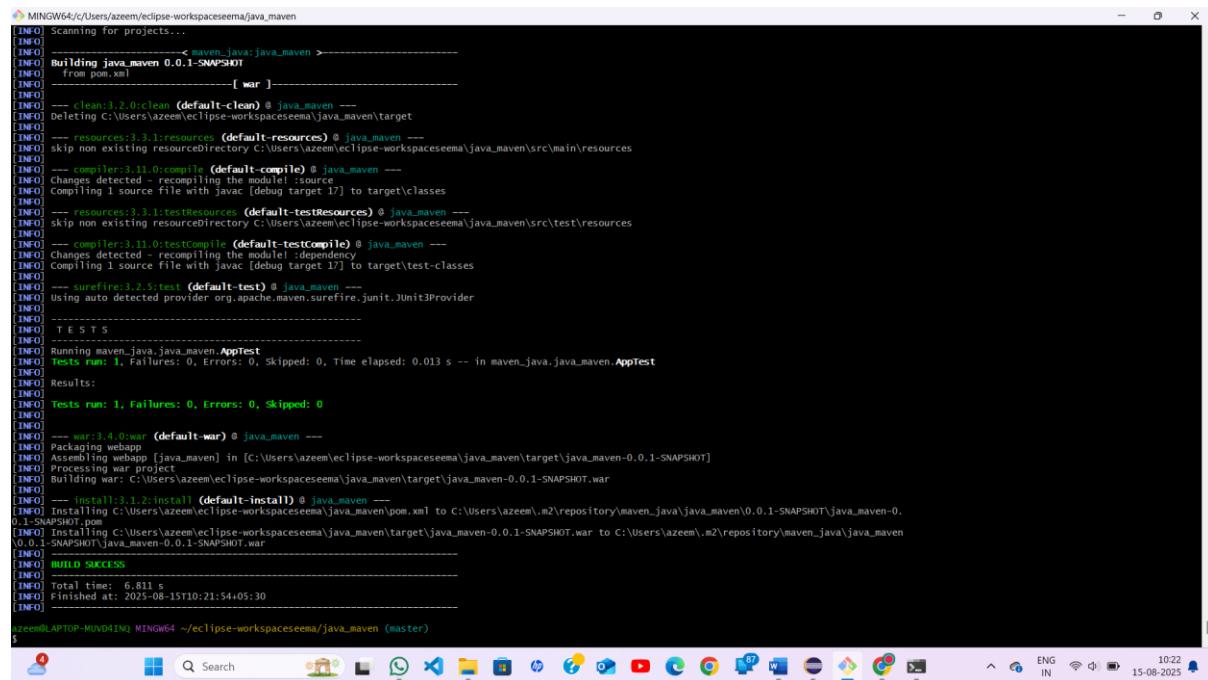
```

```

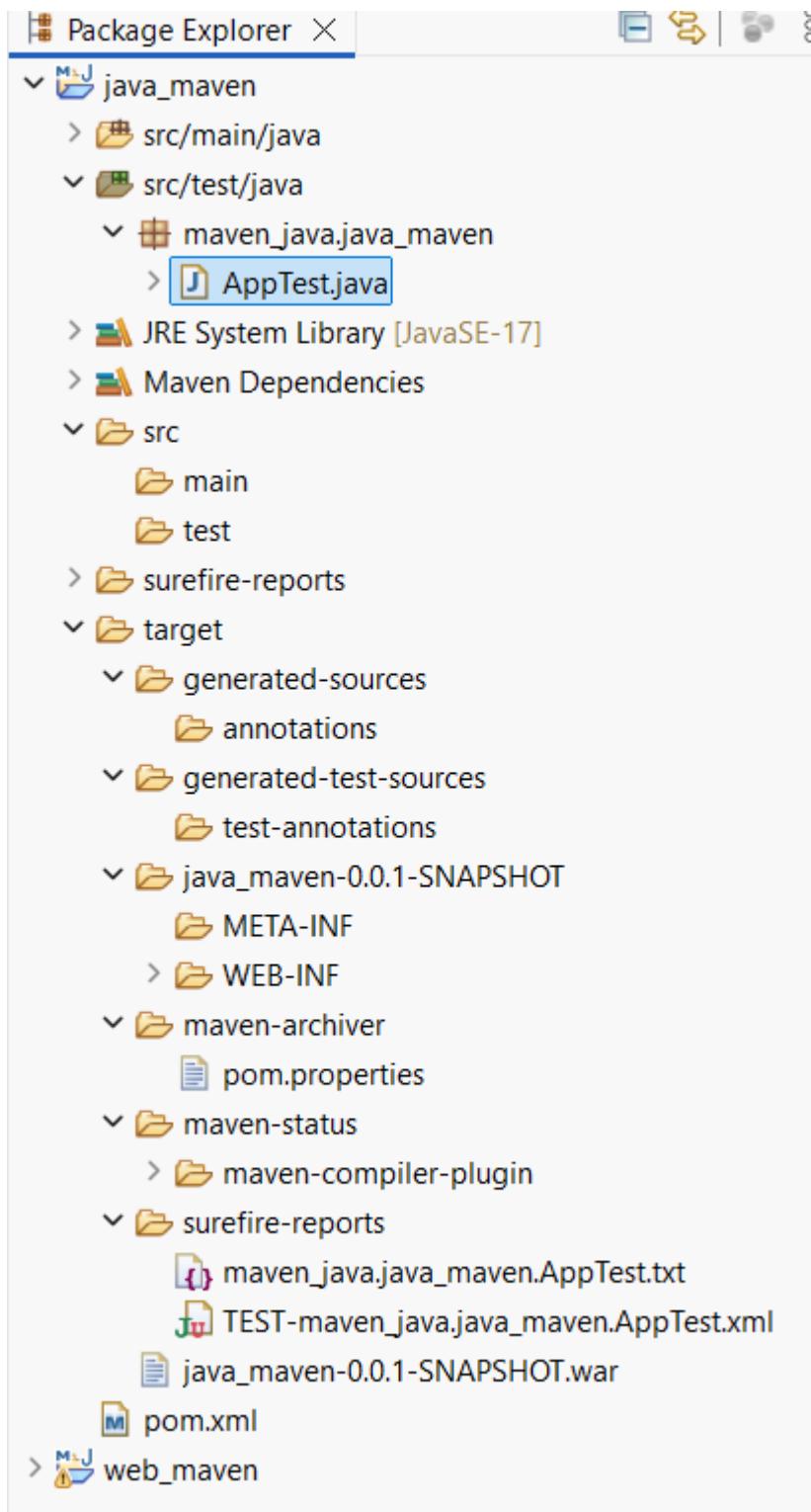
MINGW64/c/Users/azeem/eclipse-workspaceseema/java_maven
$ mvn clean verify site
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/apache/wagon/wagon-provider-api/1.0-alpha-6/wagon-provider-api-1.0-alpha-6.jar (43 kB at 183 kB/s)
[INFO] Downloading From central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm/9.5/asm-9.5.jar
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/plexus/plexus-container-default/1.0-alpha-9/plexus-container-default-1.0-alpha-9.jar (195 kB at 603 kB/s)
[INFO] Downloading From central: https://repo.maven.apache.org/maven2/org/ow2/asm/commons/9.5/asm-commons-9.5.jar
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/classworlds/classworlds/2.1-alpha-2/classworlds-2.1-alpha-2.jar (38 kB at 107 kB/s)
[INFO] Downloading From central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/9.5/asm-tree-9.5.jar
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/ow2/asm/9.5/asm-9.5.jar (122 kB at 250 kB/s)
[INFO] Downloading From central: https://repo.maven.apache.org/maven2/jacoco/org.jacoco.report/0.8.10/org.jacoco.report-0.8.10.jar
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/jacoco/core/0.8.10/org.jacoco.core-0.8.10.jar (204 kB at 389 kB/s)
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/ow2/asm/commons/9.5/asm-commons-9.5.jar (72 kB at 133 kB/s)
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/ow2/asm/asm-tree/9.5/asm-tree-9.5.jar (52 kB at 96 kB/s)
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/jacoco/org.jacoco.agent/0.8.10/org.jacoco.agent-0.8.10-runtime.jar (299 kB at 457 kB/s)
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/jacoco/org.jacoco.report/0.8.10/org.jacoco.report-0.8.10.jar (151 kB at 195 kB/s)
[INFO] Configured 1 report for jacoco-maven-plugin:0.8.10: report
[INFO] Skipping JaCoCo execution due to missing execution execution file.
[INFO] Rendering site for default locale
[INFO] Relativizing site links with respect to localized project URL: http://maven.apache.org
[INFO] Downloading From central: https://repo.maven.apache.org/maven2/org/apache/maven/skins/maven-fluido-skin/2.0.0-M6/maven-fluido-skin-2.0.0-M6.jar
[INFO] Downloaded From central: https://repo.maven.apache.org/maven2/org/apache/maven/skins/maven-fluido-skin/2.0.0-M6/maven-fluido-skin-2.0.0-M6.jar (350 kB at 762 kB/s)
[INFO] Rendering content with org.apache.maven.skins:maven-fluido-skin:jar:2.0.0-M6 skin
[INFO] Skipped "Surefire" report (maven-surefire-report-plugin:3.1.2:report-only), file "surefire-report.html" already exists.
[INFO] Rendering 9 report documents
[INFO] Generating "Surefire" report --- maven-surefire-report-plugin:3.1.2:report
[WARNING] Unable to locate Test Source XRef to link to - DISABLED
[INFO] Generating "Dependencies" report --- maven-project-info-reports-plugin:3.4.1:dependencies
[INFO] Generating "Dependency Information" report --- maven-project-info-reports-plugin:3.4.1:dependency-info
[INFO] Generating "About" report --- maven-project-info-reports-plugin:3.4.1:index
[INFO] Generating "Plugin Management" report --- maven-project-info-reports-plugin:3.4.1:plugin-management
[INFO] Generating "Plugins" report --- maven-project-info-reports-plugin:3.4.1:plugins
[INFO] Generating "Summary" report --- maven-project-info-reports-plugin:3.4.1:summary
[INFO] Generating "Project Information" report --- maven-site-plugin:4.0.0-M9:project-info
[INFO] Generating "Generated Reports" report --- maven-site-plugin:4.0.0-M9:project-reports
[INFO]
[INFO] BUILD SUCCESS
[INFO] -----
[INFO] Total time: 53.356 s
[INFO] Finished at: 2025-08-15T10:19:31+05:30
[INFO]

```

10. How do you build a Java project using Maven, and what files are generated in the target/ folder after running mvn clean install?



```
MINGW64/c:/Users/azeem/eclipse-workspaceseema/java_maven
[INFO] Scanning for projects...
[INFO]
[INFO] --- maven_java:java_maven <!-->
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]   [ war ]
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:/Users/azeem/eclipse-workspaceseema/java_maven/target
[INFO]
[INFO] --- resources:3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:/Users/azeem/eclipse-workspaceseema/java_maven/src/main/resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.1:resources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:/Users/azeem/eclipse-workspaceseema/java_maven/src/test/resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module!
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] using auto detected provider org.apache.maven.surefire.junit3Provider
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running maven.java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.013 s -- in maven.java.java_maven.AppTest
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp [java_maven] in [C:/Users/azeem/eclipse-workspaceseema/java_maven/target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:/Users/azeem/eclipse-workspaceseema/java_maven/target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] --- install:3.1.2:install (default-install) @ java_maven ---
[INFO] Installing C:/Users/azeem/eclipse-workspaceseema/java_maven/pom.xml to C:/Users/azeem/.m2/repository/maven_java/java_maven/0.0.1-SNAPSHOT/java_maven-0.0.1-SNAPSHOT.jar
[INFO] Installing C:/Users/azeem/eclipse-workspaceseema/java_maven/target\java_maven-0.0.1-SNAPSHOT.war to C:/Users/azeem/.m2/repository/maven_java/java_maven/0.0.1-SNAPSHOT/java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 6.811 s
[INFO] Finished at: 2025-08-15T02:21:54+05:30
[INFO]
```



11. How does Maven resolve dependency conflicts when two libraries use different versions of the same dependency, and how can you view and manage the dependency tree?

```
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspacesseema/java_maven (master)
$ mvn dependency:tree
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] -----[ war ]-----
[INFO]
[INFO] --- dependency:3.7.0:tree (default-cli) @ java_maven ---
[INFO] maven_java:java_maven:war:0.0.1-SNAPSHOT
[INFO] \- junit:junit:jar:3.8.1:test
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 1.580 s
[INFO] Finished at: 2025-08-15T10:26:08+05:30
[INFO] -----
```

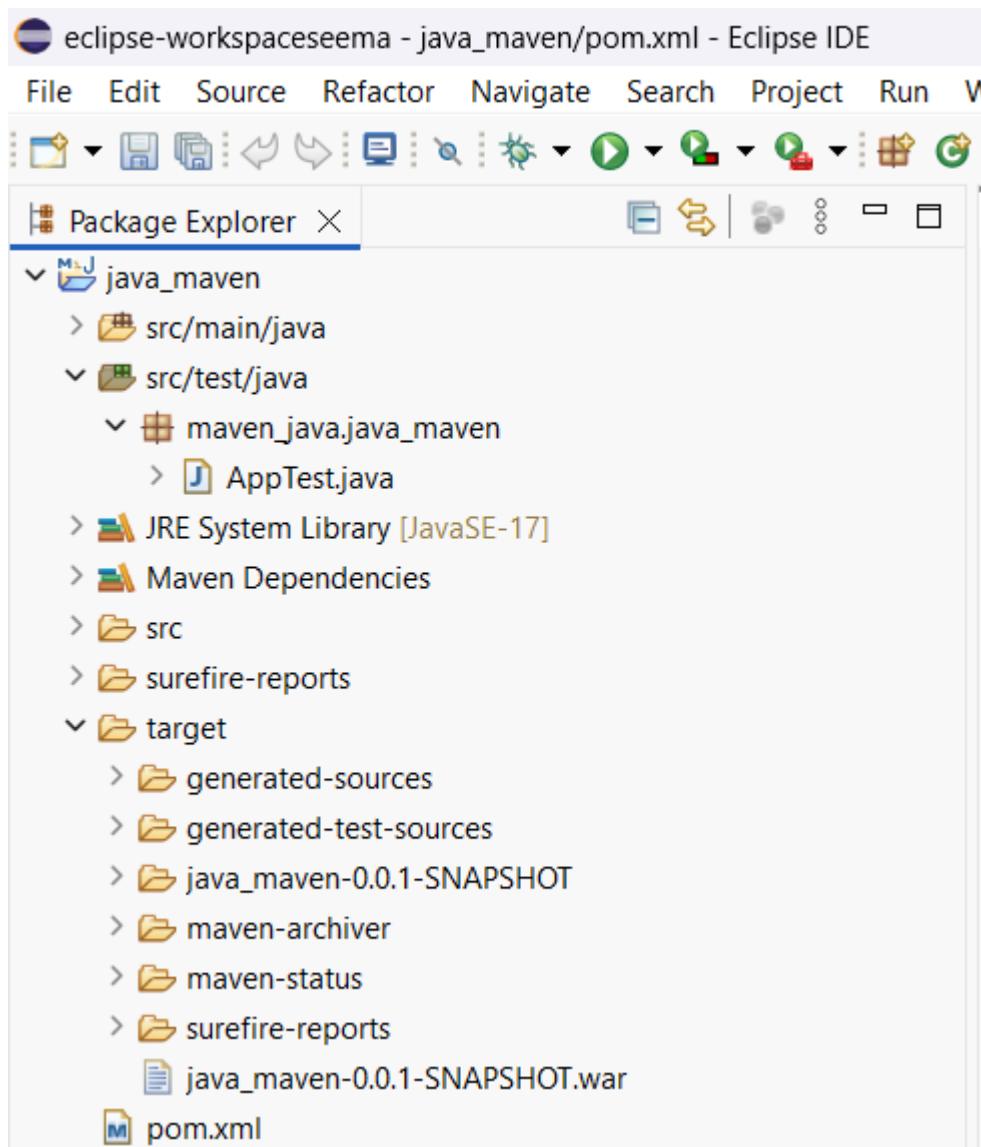
12. How do you write and run a JUnit test in a Maven project, and where are the compiled test classes and reports stored after running mvn test?

```
<properties>
    <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
</properties>

<dependencies>
    <dependency>
        <groupId>junit</groupId>
        <artifactId>junit</artifactId>
        <version>3.8.1</version>
        <scope>test</scope>
    </dependency>
</dependencies>
```

```
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven
$ mvn test
[INFO] Scanning for projects...
[INFO] [ maven_jar:java_maven >-----]
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO] from pom.xml
[INFO] [ war ]-----]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Nothing to compile - all classes are up to date
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] using auto detected provider org.apache.maven.surefire.junit3Provider
[INFO]
[INFO] ----- T E S T S -----
[INFO] Running maven_jar.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.011 s -- in maven_jar.java_maven.AppTest
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] ----- BUILD SUCCESS -----
[INFO]
[INFO] Total time: 4.277 s
[INFO] Finished at: 2025-08-15T10:27:59+05:30
[INFO]
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (master)
$
```

They are stored in the target folder



13. How can you create an executable JAR with a main method using Maven, and which plugin helps configure this behavior?

```

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ git checkout -b apply-bugfix-clean
switched to a new branch 'apply-bugfix-clean'

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn clean package
[INFO] Scanning for projects...
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]     [ war ]
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO] --- resources:3.3:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with java [debug target 1.7] to target\classes
[INFO] --- resources:3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with java [debug target 1.7] to target\test-classes
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] Tests -----
[INFO] Running maven.java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0 Time elapsed: 0.012 s -- in maven.java.java_maven.AppTest
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 5.250 s
[INFO] Finished at: 2025-08-15T03:31:04+05:30
[INFO]

```

14. How do you install and use a custom third-party JAR file in your Maven project, and how can you confirm it's included in the build and classpath?

```

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mkdir -p lib

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ echo "public class Dummy {}" > Dummy.java
javac Dummy.java
jar cf my-lib.jar Dummy.class
mv my-lib.jar lib/

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ 

azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn install:install-file \
  -Dfile=lib/my-lib.jar \
  -DgroupId=com.example \
  -DartifactId=custom-lib \
  -Dversion=1.0.0 \
  -Dpackaging=jar
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]     [ war ]
[INFO]
[INFO] --- install:3.1.2:install-file (default-cli) @ java_maven ---
[INFO] pom.xml not found in my-lib.jar
[INFO] Installing C:\Users\azeem\eclipse-workspaceseema\java_maven\lib\my-lib.jar to C:\Users\azeem\.m2\repository\com\example\custom-lib\1.0.0\custom-lib-1.0.0.jar
[INFO] Installing C:\Users\azeem\AppData\Local\Temp\mveninstall116973439673233629251.pom to C:\Users\azeem\.m2\repository\com\example\custom-lib\1.0.0\custom-lib-1.0.0.pom

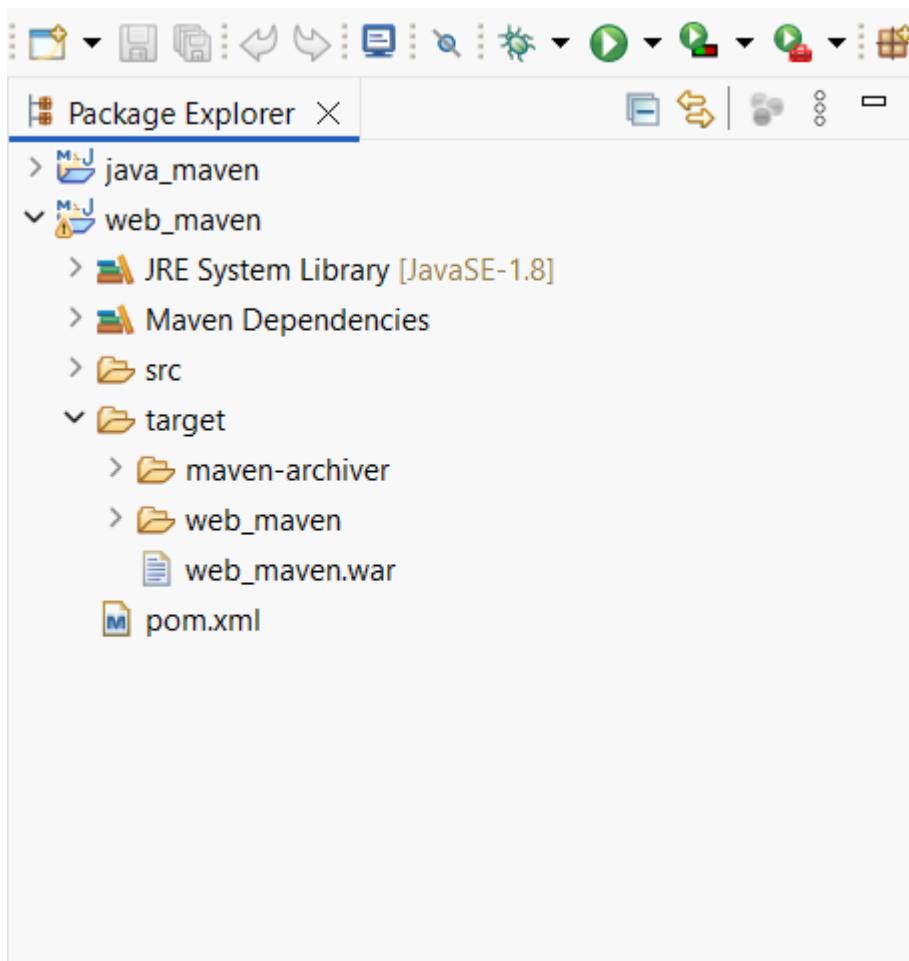
```

In pom.xml add dependency

```
<dependency>
<groupId>com.example</groupId>
<artifactId>custom-lib</artifactId>
<version>1.0.0</version>
</dependency>
```

```
azeem@LAPTOP-MUV4INQ MINGW64 ~/eclipse-workspace/seema/java_maven (apply-bugfix-clean)
$ mvn dependency:tree
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven_java:java_maven >-----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO] ----- [ war ] -----
[INFO]
[INFO] --- dependency:3.7.0:tree (default-cli) @ java_maven ---
[INFO] maven_java:java_maven:war:0.0.1-SNAPSHOT
[INFO] +- junit:junit:jar:3.8.1:test
[INFO] | \- com.example:custom-lib:jar:1.0.0:compile
[INFO] |
[INFO] BUILD SUCCESS
[INFO]
[INFO] ----- Total time: 7.341 s
[INFO] Finished at: 2025-08-15T10:48:57+05:30
[INFO] -----
```

15. How do you create a Maven web project that packages into a WAR file, and what is the standard folder structure for such a project?

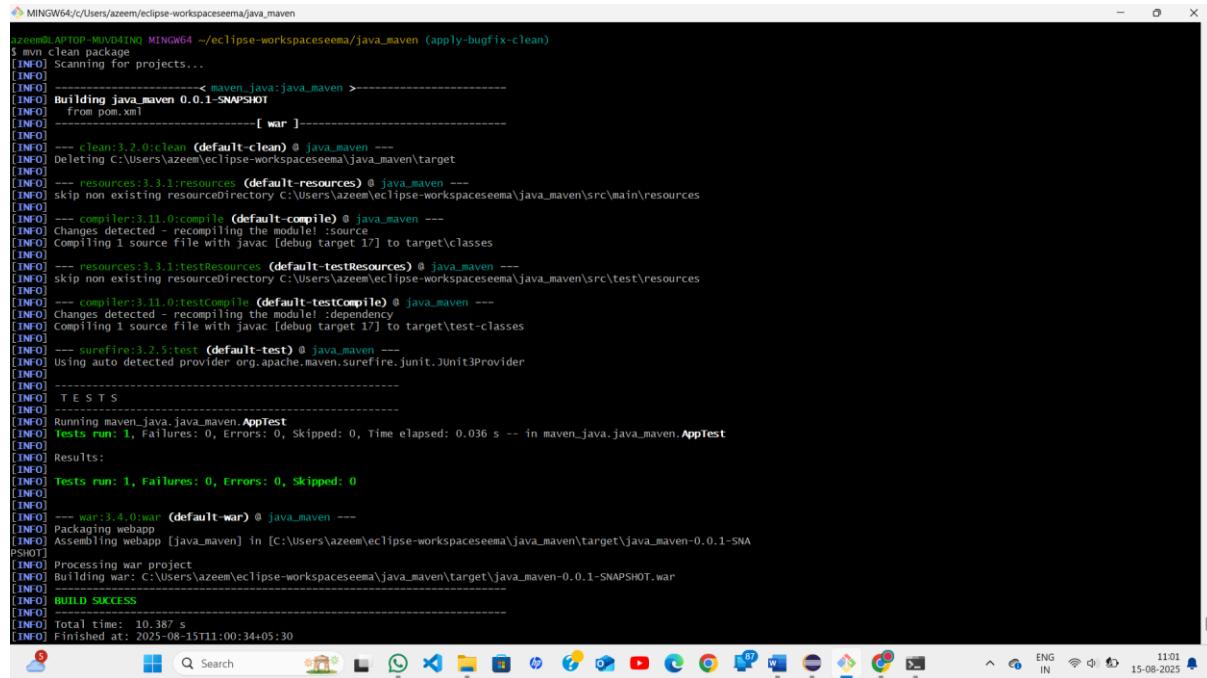


```
<groupId>web_demo_project</groupId>
<artifactId>maven_web</artifactId>
<version>0.0.1-SNAPSHOT</version>
<packaging>war</packaging>

<name>maven_web Maven Webapp</name>
<!-- FIXME change it to the project's website --&gt;
&lt;url&gt;http://www.example.com&lt;/url&gt;</pre>
```

16. What command do you use to build a WAR file in Maven, where is it generated, and how can you deploy it to a server like Apache Tomcat?

Command to Build a WAR File



```
lzeem@APTOP-MINIW41NG: MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO]   < maven:java-maven > -----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]   ----- [ war ] -----
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting c:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resourceDirectory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.3.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit.JUnit3Provider
[INFO]
[INFO] T E S T S
[INFO]
[INFO] Running maven.java.java-maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.036 s -- in maven.java.java-maven.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] Total time: 10.387 s
[INFO] Finished at: 2025-08-15T11:00:34+05:30
[INFO]
```

17. How do you add JSTL and servlet-api dependencies in a Maven web project, and why should the servlet API use provided scope instead of compile?

Add dependency in pom.xml

```
<dependencies>
    <!-- JSTL (JavaServer Pages Standard Tag Library) -->
    <dependency>
        <groupId>javax.servlet</groupId>
        <artifactId>jstl</artifactId>
        <version>1.2</version>
    </dependency>

    <!-- Servlet API -->
    <dependency>
        <groupId>jakarta.servlet</groupId>
        <artifactId>jakarta.servlet-api</artifactId>
        <version>6.0.0</version> <!-- Or use 4.x for older servlet containers
        <scope>provided</scope>
    </dependency>
</dependencies>
```

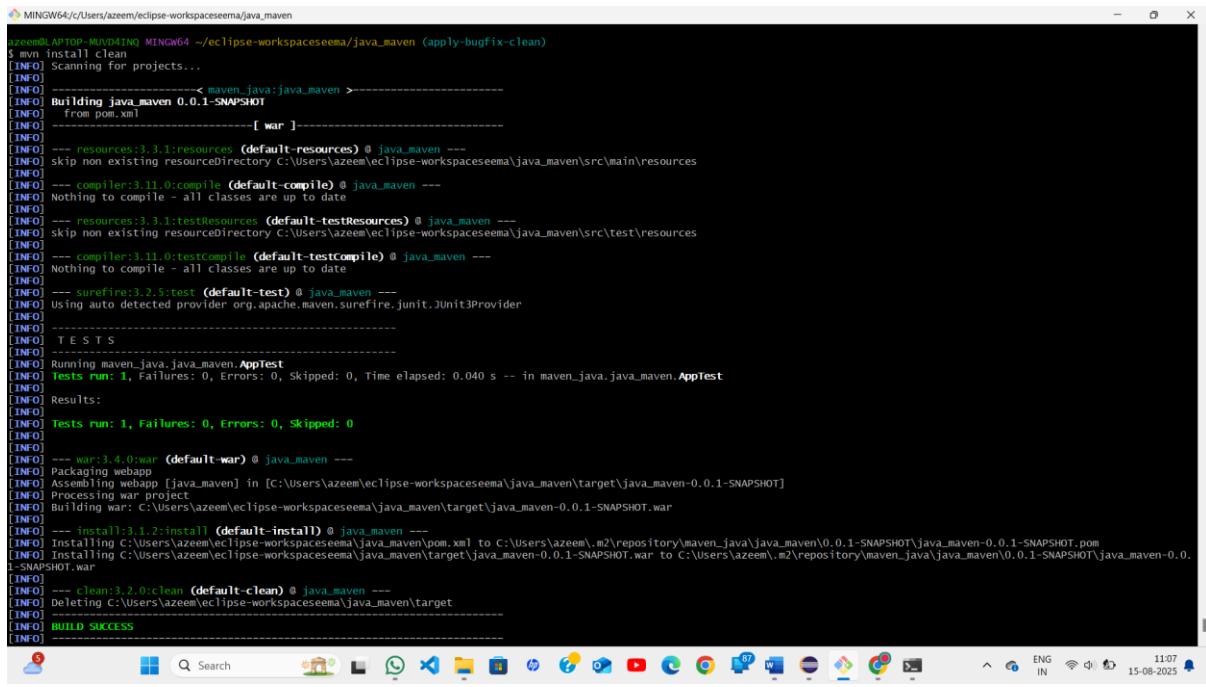
18. How do you set up a multi-module Maven web project with separate modules for core logic and web interface, and how are these modules built and connected?

```
<project>
  <parent>
    <groupId>com.example</groupId>
    <artifactId>multi-module-project</artifactId>
    <version>1.0-SNAPSHOT</version>
  </parent>

  <artifactId>web</artifactId>
  <packaging>war</packaging>

  <dependencies>
    <!-- Link to core module -->
    <dependency>
      <groupId>com.example</groupId>
      <artifactId>core</artifactId>
      <version>1.0-SNAPSHOT</version>
    </dependency>

    <!-- Servlet API (provided) -->
    <dependency>
      <groupId>jakarta.servlet</groupId>
      <artifactId>jakarta.servlet-api</artifactId>
      <version>6.0.0</version>
      <scope>provided</scope>
    </dependency>
  </dependencies>
</project>
```



```
[azeem@APTOP-MUV4TNO MINGW64 ~/eclipse-workspaceseema/java_maven]
$ mvn install clean
[INFO] Scanning for projects...
[INFO] 
[INFO] --- mavenJava:javamaven <java_maven> -----
[INFO] Building java_maven 0.0.1-SNAPSHOT
[INFO] From pom.xml
[INFO]   [war] -----
[INFO] 
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non existing resource directory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO] 
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Nothing to compile - all classes are up to date
[INFO] 
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non existing resource directory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO] 
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Nothing to compile - all classes are up to date
[INFO] 
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto detected provider org.apache.maven.surefire.junit3Provider
[INFO] 
[INFO] T E S T S
[INFO] -----
[INFO] Running mavenJava.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.040 s -- in mavenJava.java_maven.AppTest
[INFO] Results:
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO] 
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO] 
[INFO] --- install:3.1.2:install (default-install) @ java_maven ---
[INFO] Installing C:\Users\azeem\eclipse-workspaceseema\java_maven\pom.xml to C:\Users\azeem\.m2\repository\mavenJava\java_maven\0.0.1-SNAPSHOT\java_maven-0.0.1-SNAPSHOT.pom
[INFO] Installing C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war to C:\Users\azeem\.m2\repository\mavenJava\java_maven\0.0.1-SNAPSHOT\java_maven-0.0.1-SNAPSHOT.war
[INFO] 
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO] 
[INFO] BUILD SUCCESS
```

19. How do you configure a Maven web project, and how does its packaging and execution differ from a traditional WAR-based application

```
java-2/pom.xml maven_web/pom.xml AppTest.java
9   <version>0.0.1-SNAPSHOT</version>
10  <packaging>war</packaging>
11
12  <name>maven_web Maven Webapp</name>
13  <!-- FIXME change it to the project's website -->
14  <url>http://www.example.com</url>
15
16  <properties>
17      <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
18      <maven.compiler.source>8</maven.compiler.source>
19      <maven.compiler.target>8</maven.compiler.target>
20  </properties>
21
22  <dependencies>
23      <dependency>
24          <groupId>junit</groupId>
25          <artifactId>junit</artifactId>
26          <version>4.13.1</version>
27          <scope>test</scope>
28      </dependency>
29      <dependency>
30          <groupId>javax.servlet</groupId>
31          <artifactId> servlet-api</artifactId>
32          <version>2.5</version>
33      </dependency>
34  </dependencies>

maven_web
    Deployment Descriptor: maven_web
    JAX-WS Web Services
    Java Resources
    Deployed Resources
    src
    target
        m2e-wtp
            web-resources
        maven_web
            META-INF
            WEB-INF
            index.jsp
        maven-archiver
            pom.properties
            maven_web.war
    pom.xml
    Servers
```

```
MINGW64:/c/Users/azeem/eclipse-workspaceseema/java_maven
azeem@LAPTOP-MUV041NO: MINGW64 ~/eclipse-workspaceseema/java_maven (apply-bugfix-clean)
$ mvn clean package
[INFO] Scanning for projects...
[INFO]
[INFO] -----< maven.java:maven >-----
[INFO] Building maven 0.0.1-SNAPSHOT
[INFO]   from pom.xml
[INFO]     [ war ]
[INFO]
[INFO] --- clean:3.2.0:clean (default-clean) @ java_maven ---
[INFO] Deleting C:\Users\azeem\eclipse-workspaceseema\java_maven\target
[INFO]
[INFO] --- resources:3.3.1:resources (default-resources) @ java_maven ---
[INFO] skip non-existing resource directory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\main\resources
[INFO]
[INFO] --- compiler:3.11.0:compile (default-compile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :source
[INFO] Compiling 1 source file with javac [debug target 17] to target\classes
[INFO]
[INFO] --- resources:3.3.1:testResources (default-testResources) @ java_maven ---
[INFO] skip non-existing resource directory C:\Users\azeem\eclipse-workspaceseema\java_maven\src\test\resources
[INFO]
[INFO] --- compiler:3.11.0:testCompile (default-testCompile) @ java_maven ---
[INFO] Changes detected - recompiling the module! :dependency
[INFO] Compiling 1 source file with javac [debug target 17] to target\test-classes
[INFO]
[INFO] --- surefire:3.2.5:test (default-test) @ java_maven ---
[INFO] Using auto-detected provider org.apache.maven.surefire.junit.JUNIT3Provider
[INFO]
[INFO] -----
[INFO] T E S T S
[INFO] -----
[INFO] Running maven.java.java_maven.AppTest
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.046 s -- in maven.java.java_maven.AppTest
[INFO]
[INFO] Results:
[INFO]
[INFO] Tests run: 1, Failures: 0, Errors: 0, Skipped: 0
[INFO]
[INFO] --- war:3.4.0:war (default-war) @ java_maven ---
[INFO] Packaging webapp
[INFO] Assembling webapp [java_maven] in [C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT]
[INFO] Processing war project
[INFO] Building war: C:\Users\azeem\eclipse-workspaceseema\java_maven\target\java_maven-0.0.1-SNAPSHOT.war
[INFO]
[INFO] BUILD SUCCESS
[INFO]
[INFO] -----
[INFO] Total time: 9.718 s
[INFO] Finished at: 2025-08-15T11:03:19+05:30
[INFO]
```



